

CLEMSON

UNDERGRADUATE ANNOUNCEMENTS

S. C.
LD1047
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1999/00



1999-2000

UNDERGRADUATE ANNOUNCEMENTS

1999-2000

1998-99 Record
One hundred sixth year
Volume 74



PURPOSE OF CATALOG

The purpose of this catalog is to give a general description of Clemson University and to provide prospective students with detailed information regarding the various colleges and departments within the University and curricula offered by the University. Inasmuch as the educational process necessitates change, the information and educational requirements in this catalog represent a flexible program which may be altered where such alterations are thought to be in the mutual interest of the University and its students.

The provisions of this catalog do not constitute a contract which may be accepted by students through registration and enrollment in the University. The University reserves the right to change without notice any fee, provision, offering or requirement in this catalog and to determine whether a student has satisfactorily met its requirements for admission or graduation. The University further reserves the right to require a student to withdraw from the University for cause at any time.

Each curriculum shall be governed by the requirements in effect on the date of enrollment. If a student withdraws from the University and subsequently returns or does not remain continuously enrolled (summers excluded), the requirements in effect at the time of return will normally prevail.

STUDENT RESPONSIBILITY

All colleges and departments establish certain academic requirements that must be met before a degree is granted. Advisors, department chairs, and deans are available to help the student understand and meet these requirements; but the student is responsible for fulfilling them. If, at the end of a student's course of study, the requirements for graduation have not been satisfied, the degree will not be granted. For this reason, it is important for students to acquaint themselves with all academic requirements throughout their college careers and to be responsible for completing all requirements within prescribed deadlines and time limits.

ACADEMIC INTEGRITY

As members of the Clemson University community, we have inherited Thomas Green Clemson's vision of this institution as a "high seminar of learning." Fundamental to this vision is a mutual commitment to truthfulness, honor, and responsibility, without which we cannot earn the trust and respect of others. Furthermore, we recognize that academic dishonesty detracts from the value of a Clemson degree. Therefore, we shall not tolerate lying, cheating, or stealing in any form.

FAMILY EDUCATIONAL

RIGHTS AND PRIVACY ACT

The Family Educational Rights and Privacy Act of 1974 (FERPA) affords eligible students certain rights with respect to their education records. They are

1. The right to inspect and review the student's education records (provided the student has not waived this right) within 45 days of the day the University receives a request for access.

Students should submit to the registrar, dean, head of the academic department, or other appropriate official, a written request identifying the record(s) they wish to inspect. The University official will make arrangements for access and notify the student of the time and place where the records may be inspected. If the records are not maintained by the University official to whom the request was submitted, that official shall advise the student of the correct official to whom the request should be addressed.

2. The right to request the amendment of the student's education records that the student believes are inaccurate or misleading.

Students may ask the University to amend a record that they believe is inaccurate or misleading. To challenge the accuracy of an education record, the student should write to the registrar or other University official responsible for

the record, and clearly identify the part of the record he/she wants changed and specify why it is inaccurate or misleading. If the University official decides not to amend the record as requested by the student, the University official will notify his/her vice president. The vice president will then notify the student of his/her right to a hearing regarding the request for an amendment. Additional information regarding the hearing procedures will be provided to the student when notified of a right to a hearing.

- 0 The challenge of a student under this paragraph is limited to information which relates directly to the student and which the student asserts is inaccurate or misleading. With regard to a student's grade, this right does not permit the student to contest a grade on the grounds that a higher grade is deserved, but only to show that the grade has been inaccurately recorded.

3. The right to consent to the disclosure of personally-identifiable information contained in the student's education records, except to the extent that FERPA authorizes disclosure without consent.

One exception which permits disclosure without consent is disclosure to school officials with legitimate educational interest. A school official is a person employed by the University; a person or company with whom the University has contracted (such as an attorney, auditor, or collection agent); a person serving on the board of trustees; or a student serving on an official committee, such as a disciplinary or grievance committee, or assisting another university official in performing his or her tasks. A school official has a legitimate educational interest if the official needs to review an education record in order to fulfill his/her professional responsibilities.

Upon request, the University discloses education records without consent to officials of another school in which a student seeks or intends to enroll.

4. The right to refuse to permit the designation of any or all of the following categories of personally-identifiable information as directory information, which is not subject to the above restrictions on disclosure: student's full name, home address and telephone number, campus address and telephone number, campus e-mail address, date of residence, age, date and place of birth, marital status, parents' names and addresses, academic class, class schedule and class roster, name of advisor, major field of study, including the college, division, department or program in which the student is enrolled, participation in officially recognized activities and sports, weight and height of members of athletic teams, dates of attendance and graduation, degrees and honors and awards received including selection to a dean's list or honorary organization and the grade point average of students selected, and the most previous educational institution attended. Photographic, video or electronic images of students taken and maintained by the University are also considered directory information.

Directory information may be disclosed by the University for any purpose, at its discretion. Any student wishing to exercise his/her right to refuse to permit the designation of any or all of the above categories as directory information must give written notification to the Registration Services Office (E-203 Martin Hall) by the last day to register for the enrollment period concerned as published in the Clemson University calendar.

5. The right to file a complaint with the U. S. Department of Education concerning alleged failures by Clemson University to comply with the requirements of FERPA. The name and address of the office that administers FERPA is Family Policy Compliance Office, U. S. Department of Education, 600 Independence Avenue SW, Washington, DC 20202-4605.

ENGLISH FLUENCY

Clemson University has established a policy to assure that all instructional activities are conducted by individuals possessing appropriate proficiency in written and oral use of the English language. Instructional activities include lectures, recitation or discussion sessions, and laboratories. The individuals to be certified include full-time and part-time faculty, graduate teachers of record, graduate teach-

ing assistants and graduate laboratory assistants for whom English is not the first language.

A student who experiences difficulty with an instructor's written or oral English and who wishes to seek relief must do so prior to the seventh meeting of a 50-minute class and prior to the fifth meeting of a 90-minute class in regular semesters. In the five-week summer sessions, relief must be sought prior to the third class meeting.

The procedure is summarized as follows:

- a. The student must quickly bring the problem to the attention of the instructor's department chair either directly or through a faculty member such as the student's advisor. That department chair will assess the complaint and, if deemed valid, offer an appropriate remedy within two days.
- b. A student who is not satisfied with the department chair's decision or the relief suggested, may appeal within two days to a five-member hearing panel comprised of three faculty members and two students appointed by the Senior Vice Provost and Dean of Undergraduate Studies.

Students with questions should contact the Director of Undergraduate Academic Services, 101 Sikes Hall.

PATENTS AND COPYRIGHTS

All students enrolling in Clemson University do so with full understanding that

1. The University has full ownership rights in any inventions, discoveries, developments and/or improvements, whether or not patentable (inventions), which are conceived, developed or reduced to practice, or caused to be conceived, developed or reduced to practice, by undergraduate students during the course of their academic activities conducted as part of any undergraduate curriculum. Any such invention will be handled by the University in the same manner as set forth in the *Faculty Manual of Clemson University*, the pertinent provision for which appears as Part VI E entitled "Patent Policy."

2. Copyright ownership of any research work will be determined by University policy and by policies of organizations responsible for publishing or distributing copyrighted material.

Copies of the policies on patents and copyrights are available in the individual departments and colleges and in the Special Projects Office.

EQUAL OPPORTUNITY AFFIRMATIVE ACTION

Clemson University, in compliance with Titles VI and VII of the Civil Rights Act of 1964, as amended, Title IX of the Education Amendments of 1972, and Sections 503 and 504 of the Rehabilitation Act of 1973, does not discriminate on the basis of race, color, national origin, religion, sex, or disability in any of its policies, procedures, or practices; nor does the University, in compliance with the Age Discrimination in Employment Act of 1967, as amended, and Section 402 of the Vietnam Era Veterans Readjustment Act of 1974, discriminate against any employees or applicants for employment on the basis of their age or because they are disabled veterans or veterans of the Vietnam era. Clemson University conducts its programs and activities involving admission, access, treatment, employment, teaching, research, and public service in a nondiscriminatory manner as prescribed by Federal laws and regulations.

In conformance with University policy and pursuant to Executive Order 11246, as amended, Section 503 of the Rehabilitation Act of 1973, and Section 402 of the Vietnam Era Veterans Readjustment Act of 1974, Clemson University is an Affirmative Action/Equal Opportunity Employer.

Inquiries concerning the above may be addressed to the following: Executive Secretary, Clemson University Board of Trustees, 201 Sikes Hall, Clemson University, Clemson, SC 29634; Director, Office for Access and Equity, E-103 Martin Hall, Clemson University, Clemson, SC 29634; Director, Office for Civil Rights, Department of Education, Washington, DC 20201.

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ACADEMIC CALENDAR

Maymester 1999

May 10, M	Late registration and first day of class
May 11, Tu	Last day to register; late enrollment fee applies
May 13, Th	Last day to drop a class or withdraw from the University without a W grade
May 15, Sa	Classes meet
May 19, W	Last day to drop a class or withdraw from the University without final grades
May 22, Sa	Classes meet
May 25, Tu	Examinations

First Summer Session 1999

May 17, M	Late registration
May 18, Tu	Classes begin; late enrollment fee applies
May 19, W	Last day to register or add a class
May 26, W	Last day to drop a class or withdraw from the University without a W grade
June 7, M	Last day to order diploma for August graduation
June 9, W	Last day to drop a class or withdraw from the University without final grades
June 22, Tu	Examinations

Second Summer Session 1999

June 28, M	Orientation
June 29, Tu	Late registration
June 30, W	Classes begin; late enrollment fee applies
July 1, Th	Last day to register or add a class
July 5, M	Holiday
July 9, F	Last day to drop a class or withdraw from the University without a W grade
July 10, Sa	Classes meet
July 22, Th	Last day to drop a class or withdraw from the University without final grades
August 4, W	Examinations
August 6, F	Candidates may access grades via telephone IVR, Internet (CLEMWEB), or PC with modem
August 7, Sa	Graduation

Fall Semester 1999

August 15-16, Su-M	Orientation
August 16-17, M-Tu	Late registration
August 17, Tu	Convocation
August 18, W	Classes begin; late enrollment fee applies
August 24, Tu	Last day to register or add a class
August 31, Tu	Last day to drop a class or withdraw from the University without a W grade
September 7, Tu	Last day to order diploma for December graduation
October 11, M	Last day to drop a class or withdraw from the University without final grades
October 18-19, M-Tu	Fall break
November 1, M	Registration for spring, Maymester, and summer terms begins
November 24-26, W-F	Thanksgiving holidays
December 2-3, Th-F	Classes meet; exams permitted in labs only
December 6-11, M-Sa	Examinations
December 15, W	Candidates may access grades via telephone IVR, Internet (CLEMWEB), or PC with modem
December 16, Th	Graduation

Spring Semester 2000

January 9-10, Su-M	Orientation
January 10-11, M-Tu	Late registration
January 12, W	Classes begin; late enrollment fee applies
January 18, Tu	Last day to register or add a class
January 25, Tu	Last day to drop a class or withdraw from the University without a W grade
February 1, Tu	Last day to order diploma for May commencement
March 3, F	Last day to drop a class or withdraw from the University without final grades
March 20-24, M-F	Spring break
April 1-8, Sa-Sa	Honors and Awards Week
April 3, M	Registration for fall semester begins
April 27-28, Th-F	Classes meet; exams permitted in labs only
May 1-6, M-Sa	Examinations
May 11, Th	Candidates may access grades via telephone IVR, Internet (CLEMWEB), or PC with modem
May 12, F	Commencement

Maymester 2000

May 15, M	Late registration and first day of class
May 16, Tu	Last day to register; late enrollment fee applies
May 17, W	Last day to drop a class or withdraw from the University without a W grade
May 20, Sa	Classes meet
May 23, W	Last day to drop a class or withdraw from the University without final grades
May 27, Sa	Classes meet
May 30, Tu	Examinations

First Summer Session 2000

May 22, M	Late registration
May 23, Tu	Classes begin; late enrollment fee applies
May 24, W	Last day to register or add a class
May 26, F	Last day to drop a class or withdraw from the University without a W grade
June 8, Th	Last day to drop a class or withdraw from the University without final grades
June 12, M	Last day to order diploma for August graduation
June 27, Tu	Examinations

Second Summer Session 2000

July 4, Tu	Holiday
July 5, W	Orientation
July 6, Th	Late registration
July 7, F	Classes begin; late enrollment fee applies
July 8, Sa	Classes meet
July 10, M	Last day to register or add a class
July 11, Tu	Last day to drop a class or withdraw from the University without a W grade
July 15, Sa	Classes meet
July 21, F	Last day to drop a class or withdraw from the University without final grades
August 9, W	Examinations
August 11, F	Candidates may access grades via telephone IVR, Internet (CLEMWEB), or PC with modem
August 12, Sa	Graduation

Fall Semester 2000

August 20–21, Su–M	Orientation
August 21–22, M–Tu	Late registration
August 22, Tu	Convocation
August 23, W	Classes begin; late enrollment fee applies
August 29, Tu	Last day to register or add a class
September 5, Tu	Last day to drop a class or withdraw from the University without a W grade
September 12, Tu	Last day to order diploma for December graduation
October 16, M	Last day to drop a class or withdraw from the University without final grades
November 6–7, M–Tu	Fall break
November 8, W	Registration for spring, Maymester, and summer terms begins
November 22–24, W–F	Thanksgiving holidays (Wednesday, Nov. 22 is a tentative holiday.)
December 7–8, Th–F	Classes meet; exams permitted in labs only
December 11–16, M–Sa	Examinations
December 20, W	Candidates may access grades via telephone IVR, Internet (CLEMWEB), or PC with modem
December 21, Th	Graduation

Spring Semester 2001

January 7–8, Su–M	Orientation
January 8–9, M–Tu	Late registration
January 10, W	Classes begin; late enrollment fee applies
January 16, Tu	Last day to register or add a class
January 23, Tu	Last day to drop a class or withdraw from the University without a W grade
January 30, Tu	Last day to order diploma for May commencement
March 2, F	Last day to drop a class or withdraw from the University without final grades
March 19–23, M–F	Spring break
April 2, M	Registration for fall semester begins
April 7–14, Sa–Sa	Honors and Awards Week
April 26–27, Th–F	Classes meet; exams permitted in labs only
April 30–May 5, M–Sa	Examinations
May 10, Th	Candidates may access grades via telephone IVR, Internet (CLEMWEB), or PC with modem
May 11, F	Commencement

Note: Dates on this calendar were accurate at the time of printing. Dates, however, may change as conditions warrant. Current information is available at our Web site at www.clemson.edu/registrar/publicat/catalog/calendar.htm.

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GENERAL INFORMATION

HISTORY

When one man of wisdom and foresight can look among the despair of troubled times and imagine what could be, great things can happen. That is what the University's founder, Thomas Green Clemson, was able to do in the post-Civil War days. He looked upon a South that lay in economic ruin, once remarking that "conditions are wretched in the extreme" and that "people are quitting the land." Still, among the ashes he saw hope. Mr. Clemson envisioned what could be possible if the South's youth were given an opportunity to receive instruction in scientific agriculture and the mechanical arts. He once wrote, "The only hope we have for the advancement of agriculture (in the U.S.) is through the sciences, and yet there is not one single institution on this continent where a proper scientific education can be obtained." When he was president of the Pendleton Farmers Society in 1866, Mr. Clemson served on a committee whose purpose was to promote the idea of founding an institution for "educating the people in the sciences" and "which will in time secure permanent prosperity."

When he died on April 6, 1888, a series of events began that marked the start of a new era in higher education in the state of South Carolina, especially in the study of science, agriculture, and engineering. Mr. Clemson's passing set the stage for the founding of the university that bears his name—the beginning of a true "people's university," which opened the doors of higher education to all South Carolinians, rich and poor alike. In his will, Mr. Clemson bequeathed the Fort Hill plantation and a considerable sum from his personal assets for the establishment of an educational institution of the kind he envisioned. He left a cash endowment of approximately \$80,000 as well as the 814-acre Fort Hill estate to South Carolina for such a college. The biggest obstacle in the creation of an agricultural college—the initial expense—was removed by Mr. Clemson's bequest.

In November 1889, Governor Richardson signed the bill accepting Thomas Clemson's gift. Soon after a measure was introduced to establish the Clemson Agricultural College, with its trustees becoming custodians of Morrill Act and Hatch Act funds made available for agricultural education and research by federal legislative acts. The founding of Clemson Agricultural College supplanted the South Carolina College of Agriculture and Mechanics, which had opened in Columbia in 1880.

Today, more than a century later, the University is much more than its founder ever could have imagined. With its diverse learning and research facilities, the University provides an educational opportunity not only for the people of the State, as Mr. Clemson dreamed, but for thousands of young men and women throughout the country and the world.

Thomas Green Clemson came to the foothills of South Carolina when he married Anna Maria Calhoun, daughter of South Carolina's famous statesman John C. Calhoun.

Born in Philadelphia, Mr. Clemson was educated at schools both in the United States and France, where he attended lectures at the Royal School of Mines, studied with prominent scientists in the private laboratories of the Sorbonne Royal College of France, and received his diploma as an assayer from the Royal Mint in Paris. Mr. Clemson, then in his mid-20s, returned to America greatly influenced by his European studies. He became a great advocate of the natural sciences, achieving a considerable reputation as a mining engineer and a theorist in agricultural chemistry. He also was a gifted writer whose articles were published in the leading scientific journals of his day, an artist and a diplomat who represented the U.S. government as chargé d'affaires to Belgium for almost seven years.

Mr. Clemson had a lifelong interest in farming and agricultural affairs. He served as the nation's first superintendent of agricultural affairs (predecessor to the present secretary of agriculture position) and actively promoted the establishment and endowment of the Maryland Agricultural College in the 1850s. Though remembered today for these accomplishments, Thomas Clemson made his greatest historical contribution when, as a champion of formal scientific education, his life became intertwined with the destiny of educational and economic development in South Carolina. Although he never lived to see it, his dedicated efforts culminated in the founding of Clemson Agricultural College.

At the time of his death, Mr. Clemson was living at the Fort Hill homeplace, which today is a national historic landmark and provides a historic centerpiece for the Clemson University campus. He had inherited the house and plantation lands of his famous father-in-law, Senator Calhoun, upon the death of Mrs. Clemson in 1875.

Clemson College formally opened in July 1893, with an enrollment of 446. From the beginning, the college was an all-male military school. It remained this way until 1955, when the change was made to "civilian" status for students, and Clemson became a coeducational institution. In 1964, the college was renamed Clemson University as the state legislature formally recognized the school's expanded academic offerings and research pursuits.

The enrollment of Clemson has grown from 446 students at the opening of the University to 16,685 for the first semester 1998-99. Since the opening of the University, 77,750 students have been awarded Bachelor's degrees. During this same period, 426 Associate degrees, 20,967 Master's, 1,875 Doctor of Philosophy, 78 Doctor of Education, and 276 Education Specialist degrees have been awarded, a total of 101,372 degrees.

On November 27, 1989, the University observed the 100th anniversary of the State's acceptance of the terms and conditions of Mr. Clemson's bequest.

THE CAMPUS

The 1,400 acre University campus is sited on the former homestead of statesman John C. Calhoun. Nestled in the foothills of the Blue Ridge Mountains and adjacent to Lake Hartwell, the campus commands an excellent view of the mountains to the north and west, some of which attain an altitude of over 5,000 feet above mean sea level.

The Norfolk and Southern Railway and U.S. Highways 76 and 123 provide easy access to the City of Clemson and to the University. Oconee County Airport is four miles from the library. Both Atlanta and Charlotte are two hours driving time away.

Campus architecture is a pleasing blend of traditional and modern facilities enhanced by a beautiful landscape of towering trees, grassy expanses, and flowering plants. Academic, administrative, and student service buildings on campus represent an insured value of \$627 million. Clemson University's real estate holdings include over 32,000 acres of forestry and agricultural lands throughout the state, the majority of which are dedicated to Clemson's research and public-service missions.

Fort Hill, the former home of John C. Calhoun inherited by Thomas Clemson, and the Hanover House are listed on the National Register of Historic Places and are open to the public. The campus also has two recognized Historic Districts.

The Strom Thurmond Institute houses the institute offices, Senator Thurmond's papers and memorabilia, and the special collections of the Cooper Library. The Institute is a part of an instructional and public-service district that includes the Brooks Center for the Performing Arts and the Madren Center for Continuing Education.

MISSION STATEMENT

The mission of Clemson University is to fulfill the covenant between its founder and the people of South Carolina to establish a "high seminary of learning" through its land-grant responsibilities of teaching, research, and extended public service.

Clemson offers a broad array of high quality baccalaureate programs built around a distinctive core curriculum. Graduate and continuing education offerings respond to the professions, while doctoral and research programs reflect land-grant traditions and contribute to the economic future of the state and nation.

Public service extends educational programs and research findings to all citizens through personal consultation, information technology, educational and research centers, and extension offices.

GUIDING PRINCIPLES

Clemson University is a public, selective land-grant university in a rural setting committed to high quality teaching, internationally significant research, and extended public service in the context of general education, student development, public service, research, and continuing education. Clemson's desire is to attract a capable, dedicated, and diverse student body of approximately 12,000 to 14,000 undergraduate and 4,000 to 5,000 graduate students from throughout the state and nation, with priority to students from South Carolina.

The University offers a wide variety of undergraduate and graduate degrees, with emphases in the areas of agriculture, engineering, natural resources, science and technology, architecture, business, and education. The University also provides a strong fundamental education in the creative arts, health, human development, the humanities, and social sciences to all students with the goal of developing

their communication and critical thinking skills, ethical judgment, global awareness, and scientific and technological knowledge.

Just as Clemson values its students, the University also values the men and women of its faculty and staff who have committed their talents and careers to its enduring mission as a land-grant university. Clemson pledges to support their work, to evaluate their professional performance, to compensate them at nationally competitive levels, and to encourage their professional development.

ACCREDITATION

Clemson University is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools to award the Bachelor's, Master's, Specialist, and Doctor's degrees. Curricula are accredited by Accreditation Board for Engineering and Technology, Computing Sciences Accreditation Board, Council on Accreditations of the National Recreation and Park Association, Human Factors and Ergonomics Society, International Association for Management Education, Landscape Architecture Accreditation Board, National Architectural Accrediting Board, National Association of State Directors of Teacher Education and Certification, National Council for Accreditation of Teacher Education, National League for Nursing, Planning Accrediting Board, and Society of American Foresters. Documentation of accreditation is available in the college deans' offices.

LIBRARIES

Clemson's main library, the Robert M. Cooper Library, is located at the center of campus and provides students with a variety of services and up-to-date collections. More than 1.6 million items are available as books, periodicals, microforms, government publications, and electronic materials.

Access to the Libraries' collections is provided through the Online Libraries Catalog, a part of the Libraries' CU Explorer system. To assist in finding journal and newspaper articles, the Libraries have provided access to a number of electronic indexes, several of them giving access to full-text journals online. CU Explorer is accessible from most computers on campus as well as through dial access. Among the regular services the Libraries offer are circulation, reference, interlibrary loan, class instruction, tours, and photocopies. In addition, the Cooper Library houses two open computer laboratories maintained by DCIT; assistance is available by calling the Help Desk at 656-3494.

In addition to the Cooper Library, the University Libraries include the Emery A. Gunnin Architectural Library in Lee Hall and the Special Collections Unit located in the Strom Thurmond Institute Building. These branch libraries contain materials dealing with the special nature of their programs. A small reading room containing periodical literature related to chemistry is located in the Hunter Chemistry Laboratory. Detailed information regarding facilities, hours of operation, loan privileges, policies, and fine regulations is available at the circulation and reference desks and on the Libraries' Web site.

COMPUTING FACILITIES

The Division of Computing and Information Technology (DCIT) supports the computing activities of students and employees with an extensive network of computers. DCIT maintains 13 computer labs, containing high-end PCs and laser printing equipment, throughout the campus. Students have access to the Internet, electronic mail, word processing, and spreadsheet applications. DCIT also provides services through the Collaborative Learning Environment (CLE). The CLE facilitates the use of technology in teaching and research by offering a wide array of tools and resources. Access to CLE services for each course section is automatically maintained through the class enrollment system. Additional information is available on the Web at cle.clemson.edu.

An extensive array of computer hardware is housed at the Information Technology Center (ITC) in the Clemson Research Park. DCIT operates a statewide computing network incorporating processors from a variety of vendors. The major general purpose computers are an HDS Pilot 25 computer with one gigabyte of memory and 215 gigabytes of EMC storage, running the OS/390 operating system and a SUN E3000 UNIX system. A host of Novell and SUN servers provide computing resources for client-server computing. Approximately 3,500 PCs and workstations are connected to the campus FDDI/Ethernet network. A high performance computing environment is provided in the form of a SUN E6000 with four gigabytes of memory, sixteen 336MHz processors and 135 gigabytes of RAID disks.

Computer training is available to all students and employees as part of regular University courses, through short courses, and special training programs for various kinds of users. A complete list of services is available on the Web at dcit.clemson.edu.

CALHOUN COLLEGE HONORS PROGRAM

Established in 1962, Calhoun College strives to enrich the educational experience of highly motivated, academically talented students by providing opportunities for scholarship and research not always available to undergraduates.

Participation in the program is by invitation to entering freshman with SAT scores of 1300 and above who rank within the top 10 percent of their high school graduating class. Enrolled students may join the program if they have earned a cumulative grade-point ratio of 3.40 or better as full-time students at Clemson and have earned no more than 75 credit hours or have at least four semesters remaining in their degree programs. To continue membership in Calhoun College, students must maintain a cumulative grade-point ratio of 3.40 or higher and must complete at least one honors course each semester.

The honors curriculum consists of two components. To earn General Honors, students must demonstrate breadth by completing at least four honors courses totaling a minimum of 14 semester hours with no more than eight hours or two courses within that minimum in any one subject. Courses chosen are usually 100-200 level courses that satisfy General Education requirements.

Normally undertaken in the junior and senior years, Departmental Honors provides opportunities for honors students to do advanced, in-depth study and research within their major academic disciplines. Specific requirements are set by the department, but all students are expected to complete a thesis, portfolio of creative works, major research project, or similar capstone achievement.

Students completing both General Honors and Departmental Honors are recognized at an awards ceremony on the eve of commencement, at which time they are presented the B. C. Inabinet Honors Medallion. This medallion, as well as the student's diploma, permanent transcript, and commencement program, recognizes Honors Program graduates as Calhoun College scholars.

In addition to the intellectual challenge of Honors, advantages of membership in Calhoun College include priority course scheduling, honors housing (on a space-available basis), extended library loan privileges, and special lectures and cultural events.

Calhoun College is institutionally responsible for administering the Dixon Fellows Program which helps students prepare to compete for Rhodes, Marshall, Truman, Fulbright, and other prestigious post-graduate scholarships.

COOPERATIVE EDUCATION

The Cooperative Education Program is a planned program in which students combine alternate periods of academic study and periods of related work with a participating business, industry, agency, or organization. Work periods normally take place during the sophomore and junior years (including summers), while the freshman and senior years are spent in full-time study.

Students qualify for participation in the Cooperative Education Program by satisfactory completion of thirty semester hours of academic work. Transfer students may qualify in one semester. Three, four, or five co-op work periods are projected and included in each student referral. Usually two students from the same academic area are paired to fill a full-time work position.

Students enrolled in the Cooperative Education Program pay a registration fee of \$15 each semester or summer session which coincides with their work period. That fee enables students to maintain student status and participate in student activities and services that are normally associated with being enrolled at the University. However, the fee does not cover the cost of tuition for academic courses, health service, or any of the other benefits normally associated with the standard University fee. In responding to insurance, tax, loans, and other questionnaires about status, the University classifies a student on work assignment to be a full-time continuing student. The work assignment is considered an integral part of the student's education, but no academic credit is awarded for this experience.

STUDY AND WORK ABROAD PROGRAMS

Through the Office of International Services and Diversity Programs, students can choose from a variety of programs offered overseas. Programs are varied to fulfill the needs of most students, from the Agriculture Exchange Program in Aberdeen, Scotland, to the engineering exchange and summer program at the University of Bristol in England, to the language and international trade exchange and summer programs in Mexico, Ecuador, France, Germany, and Spain. Exchange and summer programs abroad are offered in Australia, Costa Rica, Czech Republic, Ecuador, England, France, Germany, Japan, Mexico, Scotland, Spain, and more. Both Clemson Programs Abroad and the International Student Exchange Program (ISEP) allow students to enroll, pay tuition, fees, and room and board directly to Clemson while they study abroad. With the ISEP Program, students can study for a semester or an academic year at one of more than 80 institutions world-wide. Transfer credit usually applies within the major with prior academic department approval. Financial aid and scholarships may also transfer for many of the Clemson programs abroad.

Students who study abroad gain valuable experience. Internships and work abroad programs are also available. Applications are usually due in October for spring programs, in February for fall and academic year programs, and in April for summer programs. Interested students should contact the Study Abroad Advisor in E-208 Martin Hall at the beginning of each semester.

RESERVE OFFICERS TRAINING CORPS

Air Force and Army

The Departments of the Army and the Air Force maintain ROTC units at Clemson University. Their mission is to produce officers of high quality for technical and nontechnical careers in the U. S. Army and Air Force. Two- and four-year programs are available. The four-year program consists of the basic course for freshmen and sophomores and the advanced course for juniors and seniors.

Scholarships, available to selected ROTC students, pay for tuition, books, and laboratory expenses, in addition to \$150 per month during the school year. Nonscholarship advanced cadets also receive \$150 per month. Basic course credit may be awarded to students having prior military service.

Selected advanced Air Force cadets receive flight training at government expense. Reserve or National Guard duty can be guaranteed by the U. S. Army.

Cadets who complete the Advanced or Professional Course and satisfy commissioning requirements are appointed Second Lieutenants. Ample opportunity exists for graduate study in both services, with temporary deferments possible.

HONOR ORGANIZATIONS

Clemson University has a number of academic honorary societies which recognize outstanding scholarship by students, faculty, and staff. These include the following:

- Alpha Epsilon Delta (Biology)
- Alpha Lambda Delta (Freshman)
- Alpha Pi Mu (Industrial Engineering)
- Beta Alpha Psi (Accounting)
- Calhoun Society (Honors College)
- Chi Epsilon (Civil Engineering)
- Golden Key (Honor Society)
- Mu Beta Psi (Music)
- Omicron Delta Kappa (Juniors and Seniors)
- Order of Omega (Greek)
- Phi Kappa Phi
- Phi Sigma Pi (Honorary)
- Psi Chi (Psychology)
- Sigma Xi
- Tau Beta Pi
- Xi Sigma Pi (Forestry)

SOUTH CAROLINA AGRICULTURE AND FORESTRY RESEARCH SYSTEM

Since 1886, researchers at the South Carolina Agriculture and Forestry Research System (SCAFRS) have been addressing the problems of agriculture, agribusiness, and the physical and social environment. In addition to the major activities of the SCAFRS on the Clemson University campus, research facilities are located in Blackville, Florence, Charleston, Columbia, and Georgetown.

The mission of the SCAFRS is to develop knowledge through research that will provide information South Carolina citizens need to make intelligent decisions on matters concerning agriculture, forestry, natural resources, and the environment. Scientists cooperate with researchers in other states and throughout the world to create a better standard of living for South Carolinians by enhancing their use of natural resources. Over the years, scientists have worked in food development and improvement, farming techniques, and packaging of biological materials. They continue to work in the new scientific areas of genetic engineering and computer information.

The SCAFRS has an annual budget of more than \$32 million which supports the efforts of more than 145 research faculty and more than 230 support personnel. Graduate students use SCAFRS facilities in their research and educational programs.

CLEMSON UNIVERSITY FOUNDATION

The Clemson University Foundation is a nonprofit organization which solicits, manages, and administers gifts from private sources to the academic programs at Clemson University.

Originally chartered in 1933, the foundation is a primary component of the Advancement Program at the University. There are 36 voting members of the Board of Directors who oversee the Foundation's activities. Currently 33 of the 36 elected directors are alumni of the University. Other voting directors include the President and Vice President of the Alumni Association and the Alumni National Council and President and Vice President of IPTAY. The President of the University, Vice President for

University Advancement, and the Chief Alumni and Development Officer serve as ex-officio directors. The Director of Gift and Asset Management serves as treasurer, and the Director of Advancement Services serves as secretary. The Vice President for University Advancement serves as the Executive Vice President for the Foundation, and the Chief Alumni and Development Officer serves as Executive Director. Also represented on the Board are the Provost, a deans' representative, and the President of the Faculty Senate.

The Foundation operates through an effective committee structure that reports through an executive committee to the full board. An administrative division directs its attention to real estate, investments, policy and bylaws, and nominations. A fundraising division is managed by the Campaign Executive Committee which is responsible for the Clemson Fund, planned gifts, major gifts, and corporate and foundation solicitation. Working directly with the executive committee is the Clemson Real Estate Foundation. Market value of the Foundation's assets as of June 1998 was approximately \$201.4 million plus some \$9 million in real estate holdings.

CLEMSON ALUMNI ASSOCIATION

The Clemson Alumni Association has been recognized as one of the top such organizations in the country. The mission of the Alumni Association includes three primary actions: serving, involving, and informing. The Association stresses service to more than 85,000 alumni and to a student body of 17,000. Regular programs designed to strengthen the loyalty and interest alumni have for their Alma Mater are conducted on and off campus. Clemson Clubs are located across the world, and Clemson graduates are located in every state and most foreign countries. Reunions, student alumni programs, constituency programs and young alumni programs form the basis for an array of services to benefit Clemson and its alumni.

All services of the National Alumni Association are coordinated out of offices located in the Clemson Alumni Center, a campus focal point built, furnished, and equipped entirely by gifts from alumni especially for that purpose. The University's Visitors Center, a gift of the Class of '44, is adjacent to the Alumni Center and is a perfect "first stop" for anyone visiting or returning to campus. Records of addresses, employment, and biographical information are kept on alumni as well as on thousands of former students who express a desire to be involved with the University and its alumni program.

A regular publication program keeps active alumni, friends, and parents aware of Clemson's programs in teaching, research, and public service. The *Clemson World* magazine is published quarterly.

Traditional programs such as the Alumni Distinguished Service Awards, professorships, Philip H. Prince Alumni Presidential Scholars, Jervey Scholars, R. F. Poole Scholars, and awards for distinguished teaching, outstanding research, and public service are recognized as the most prestigious of their kind on campus.

ADMISSION

APPLICATION FORMS AND DATES

Application forms may be obtained by writing the Office of Admissions, Clemson University, 105 Sikes Hall, Box 345124, Clemson, SC 29634-5124. Application forms and catalogs for all 1999 entry dates are available beginning September 1998. Preliminary application forms are available anytime for those who wish to be included in the September mailing. Freshman candidates are especially encouraged to submit preliminary applications and sit for the SAT I or ACT during the spring semester of their junior year. Copies of both the preliminary application and the application for admission are available on the Internet at www.clemson.edu.

Candidates should understand that admission is closed when all classroom space has been committed. The majority of freshman admission decisions are reached during the period November through March. Transfer students seeking entrance in August usually are notified between February and July. Candidates must submit a nonrefundable fee of \$40 with their application. This fee is not applicable toward tuition and/or other University fees.

Deadlines for submitting an application follow:

	Freshman	Transfer
Fall Semester	May 1	August 1
Spring Semester	December 15	December 1

Transfer student deadlines for submitting official transcripts (except for current term) are as follows:

Fall Semester—August 13
Spring Semester—December 1

FRESHMEN

Admission to the University is competitive and is based primarily upon high school curriculum, grades, class standing, and SAT I or ACT scores. An applicant's intended major and state residency also receive consideration. To apply for admission, a candidate must submit a high school transcript through his/her counselor and have results of the SAT I or ACT sent directly from the testing agency. In addition, all South Carolina public senior colleges and universities require that applicants for freshman admission complete the following courses in high school:

English—4 credits

At least two credits must have strong grammar and composition components, with at least one in English literature, and at least one in American literature. College preparatory English I, II, III, and IV will meet these requirements.

Mathematics—3 credits

These include algebra I (for which applied mathematics I and II may count together as a substitute, if a student successfully completes algebra II), algebra II, and geometry. A fourth mathematics course is strongly recommended and should be selected from precalculus, calculus, statistics, or discrete mathematics.

Laboratory Science—2 credits

At least one unit each of two laboratory sciences chosen from biology, chemistry, or physics is re-

quired. A third unit of a laboratory science is strongly recommended.

Foreign Language—2 credits

Credits must be in the same foreign language.

Social Studies—3 credits

One unit of American history is required. One-half unit of government and one-half unit of economics are also strongly recommended.

Physical Education/ROTC—1 credit

Either physical education or ROTC is required.

Other—1 credit

Advanced mathematics or computer science or a combination of these is required; or one unit of world history, world geography, or Western Civilization.

High School Course Prerequisites for Freshmen Entering in 2001 and Beyond

English—4 credits

All four courses must have strong grammar and composition components, with at least one in English literature and at least one in American literature. College preparatory English I, II, III, and IV will meet these requirements.

Mathematics—3 credits

These include algebra I (for which applied mathematics I and II may count together as a substitute if a student successfully completes algebra II), algebra II and geometry.

Laboratory Science—3 credits

Two must be selected from biology I, chemistry I, or physics I.

Foreign Language—3 credits

All three must be earned in the same language.

Social Sciences—3 credits

American history is required. One half credit of government and one half credit of economics are also recommended.

Physical Education/ROTC—1 credit

Other—2 credits

One of these must be a fourth year of mathematics, laboratory science, or foreign language. Students interested in engineering are strongly encouraged to take a fourth year of mathematics. This course should be selected from precalculus, calculus, statistics, or discrete mathematics. The second credit must be in advanced mathematics, computer science, or a combination of these; or one unit of world history, world geography, or western civilization.

The SAT I or ACT examination scores, rank in class, academic preparation, and recommendation of the high school counselor will be weighed carefully in the decision-making process. The applicant's acceptance will be confirmed upon presentation of a final high school transcript indicating continued academic progress and graduation.

IB Higher Level Examination	Level Grade	Credit Allowed Toward Degree	Credits
Art/Design	4, 5, 6, 7	ART 103	3
Biology	5, 6	BIOL 103, 104, or BIOL 101, 102	8
	7	BIOL 110, 111	10
Business and Organization	5, 6, 7	MGT 301	3
Chemistry	5, 6, 7	CH 101 (for majors requiring organic chemistry)	4
	5	CH 101 (for majors not requiring organic chemistry)	4
	6, 7	CH 101, 102 (for majors not requiring organic chemistry)	8
Economics	5, 6, 7	ECON 211	3
English (Language A)	5, 6, 7	ENGL 208	3
	5, 6, 7	ENGL 101 ¹	3
Foreign Language	4	FR 101, GER 101, ITAL 101, JAPN 101, RUSS 101, or SPAN 101	4
	5, 6, 7	FR 101, 102, GER 101, 102, ITAL 101, 102, RUSS 101, 102 or SPAN 101, 102	8
History-European	5, 6, 7	HIST 173	3
History-Americas	5, 6, 7	HIST 101 and 102	6
Mathematics	5	MTHSC 106 ²	4
	6, 7	MTHSC 106	4
Music	5, 6, 7	Determined on individual basis	
Psychology	5, 6, 7	PSYCH 201	3
Theatre Arts	5, 6, 7	Determined on individual basis	

¹Credit for English 101 is conditional; students will be allowed to take an exemption examination (a writing test) administered by the English Department.

²For students taking the calculus sequence, MTHSC 106 and 108. Upon completion of MTHSC 108 with a grade of C or better, credit will be given for MTHSC 106.

Entrance Examinations

All freshman candidates and some transfer students must submit scores from either the SAT I or the ACT. In most cases, students transferring from accredited colleges need not submit SAT I or ACT scores if they have earned thirty or more transferable semester hours with a 2.5 grade point average (based on a 4.0 scale). Those enrolled in technical programs at technical or community colleges usually will be required to submit SAT I or ACT scores.

For August enrollment, it is recommended that students complete the SAT I or ACT no later than

the preceding December. Registration materials for these tests are readily available at high schools or can be obtained by contacting the College Board (609) 771-7600 or (800) SAT-SCOR, or the American College Testing Service (319) 337-1313. All candidates must have their scores reported to Clemson by contacting the appropriate testing agency. The College Board's institutional code for Clemson is 5111. The ACT code for Clemson is 3842. Photocopies of student test reports or those submitted by third parties, such as high schools and colleges, are not accepted.

College Board Advanced Placement Examination		AP Grade	Credit Allowed Toward Degree	Credits
ECONOMICS	Microeconomics	3, 4, 5	ECON 211	3
	Macroeconomics	3, 4, 5	ECON 212	3
ENGLISH	Composition and Literature	3, 4	ENGL 101	3
		5	ENGL 101, 102	6
	Language and Composition	3, 4	ENGL 101	3
		5	ENGL 101, 102	6
	Both Tests	3, 4 on each	ENGL 101, 102	6
GOVERNMENT	American Government	3, 4, 5	PO SC 101	3
	Comparative Government	3, 4, 5	PO SC 102	3
HISTORY	American History	3, 4, 5	HIST 101, 102	6
	European History	3, 4, 5	HIST 173	3
HUMANITIES	Music Theory	3, 4, 5	MUSIC 205, 206	6
	Music Literature	3, 4, 5	MUSIC 210	3
	Art History	3, 4, 5	A A H 210	3
	Studio Drawing	3, 4, 5	ART 205	3
	General Studio	3, 4, 5	ART 103	3
LANGUAGES	French Language	3, 4, 5	FR 101, 102	8
		3	FR 101, 102	8
		4	FR 101, 102, 201	11
	French Literature	5	FR 101, 102, 201, 202	14
		3, 4, 5	GER 101, 102	8
		3	LATIN 101, 102, 201	11
	German Language	4, 5	LATIN 101, 102, 201, 202	14
		3, 4, 5	SPAN 101, 102	8
	Spanish Language	3	SPAN 101, 102	8
		4	SPAN 101, 102, 201	11
		5	SPAN 101, 102, 201, 202	14
MATHEMATICS	Calculus AB	3, 4, 5	MTHSC 106	4
	Calculus BC	3, 4, 5	MTHSC 106, 108	8
	Statistics	3, 4	MTHSC 203	3
		5	MTHSC 101, 203	6
PSYCHOLOGY	Psychology	3, 4, 5	PSYCH 101	3
SCIENCE	Biology	3	BIOL 103, 104	8
		4, 5	BIOL 110, 111	10
	Chemistry	3, 4, 5	CH 101 and 102 or 112	8
	Computer Science A	3, 4, 5	CP SC 101	4
	Computer Science AB	3, 4 ¹	CP SC 101	4
	Computer Science AB	5	CP SC 101, 102	8
	Environmental Science	3, 4, 5	EN SP 200	3
	Physics B ²	3, 4, 5	PHYS 207, 208	8
	Physics C (Mechanics)	3, 4, 5	PHYS 122, 124	4
	Physics C (Electrical and Magnetism)	3, 4, 5	PHYS 221, 223	4

¹Students earning a grade of 4 on Computer Science may request a personal interview with a departmental representative to determine whether credit will be given for CP SC 102.

²Students enrolling in curricula requiring calculus-based physics (PHYS 122, 221, 222, 223, 224), but who earn a grade of 5 on Physics B, will be asked to meet with a departmental representative for further evaluation and placement counseling.

International Baccalaureate (IB)

Credit Policy

Clemson University endorses the International Baccalaureate (IB) Program and awards credit for IB Higher Level scores as indicated below.

College Board Advanced Placement Program

The College Board Advanced Placement Program (AP) gives highly motivated high school students an opportunity to begin their college careers during the last year or two of high school. AP participants take college-level courses in their high schools, sit for nationally administered examinations in the subjects concerned, and submit test grades to Clemson for credit. Credit is awarded to those earning grades of 3, 4, or 5 on AP exams.

Placement Tests

Mathematics placement—Freshmen mathematics placement is determined by the applicant's score on one of the following tests: College Board SAT II Mathematics Level IIC Subject Test, College Board Advanced Placement (AP) Examination in Calculus or Statistics, or the International Baccalaureate (IB) Higher Level Mathematics Examination. Failure to sit for one of these exams will result in placement in preparatory work that, in most cases, will not apply toward the freshman mathematics requirement.

Foreign Language Placement—Applicants desiring advanced placement in a foreign language may take the College Board's SAT II Subject Tests, Advanced Placement (AP) Examinations, or the International Baccalaureate (IB) Higher Level Examination. The Department of Languages also offers placement exams which students may take during summer orientation. SAT II scores of 450 or higher enable students to exempt one or more language courses. These students will receive credit following the successful completion (grade of C or higher) of a qualifying course at Clemson.

GED

Candidates submitting General Educational Development (GED) credentials in lieu of a high school diploma must be 19 years of age or older. Official GED score results must be received directly from the General Educational Development Testing Service along with an official copy of the high school transcript and SAT I or ACT scores. Applicants presenting the GED will be reviewed by the Admissions Exceptions Committee.

Appeals

Any freshman or transfer candidate who is denied admission may appeal for reconsideration provided the student (1) presents new information, such as improved grades and/or class rank, improved SAT I or ACT scores, or SAT II Subject Test scores; and (2) submits a letter outlining the rationale for the appeal. All appeals will be reviewed by the Office of Admissions. In some instances, appeals will be referred to the Admissions Exceptions Committee.

Admissions Exceptions

If it is not possible to make a positive decision on the basis of previous academic performance and SAT I or ACT scores, other factors, such as special talents or high school profile, may be considered. Where appropriate, the Office of Admissions will refer such cases to the Admissions Appeals Committee. Student-athletes who do not meet regular admissions standards may be admitted if they meet Atlantic Coast Conference (ACC) and National Collegiate Athletic Association (NCAA) eligibility requirements.

Conditional Admission

Freshman students who are accepted to and enrolled in Clemson University in a conditional admissions program must meet the conditions of their admission or be subject to disenrollment.

TRANSFER STUDENTS

All transfer applicants must have original transcripts of their records sent to Clemson directly from each college or university attended. Unless so stated on the transcript, the candidate should present statements of honorable dismissal and of eligibility to return to the institution last attended. To be considered for admission, candidates should have 30 semester (45 quarter) hours of work with a cumulative average of approximately a C+ (2.5 on a 4.0 scale).

SAT scores are required of some transfer students, and high school transcripts may be required in some instances. Candidates will be notified individually if either or both of these credentials are needed.

Transfer Credit

Coursework completed with a grade of C or higher at other regionally accredited institutions, including correspondence courses, telecourses, and exempted courses, will be evaluated for transfer in terms of equivalent courses included in the Clemson curriculum of the student's choice. This does not guarantee that all courses taken at other institutions will be accepted for transfer. The acceptability of each course or exemption will be based on an evaluation by the faculty concerned. Coursework earned at different institutions will not be joined to equate with one Clemson course. No course taken at a nonbaccalaureate-degree granting institution may be used as an equivalent or substitute for any 300- or 400-level Clemson course.

Learning experiences including, but not limited to, military service schools, non-collegiate sponsored instruction, work related experiences, etc. will not be evaluated for transfer; however, enrolled students may request credit by examination from the appropriate department for any non-transferable learning experience. For additional information, see section entitled *Advanced Placement and Credit by Examination* in this catalog.

Students transferring may select the curriculum that was outlined in the *Clemson University Announcements* at the time they entered the sending institution, provided they have been in continuous enrollment. Further, transfer students may select any curriculum adopted subsequent to that initial cur-

riculum. After enrolling at Clemson, if transfer students change from one major to another, they will complete all of the requirements included in the new curriculum that are in effect at the time of the change. If all work toward a degree is not completed within six years after the initial enrollment at the sending institution, the student may be required to take additional courses.

Transfer: State Policies and Procedures

Section 10-C of the South Carolina School-to-work Transition Act (1994) stipulates that the Council of College and University Presidents and the State Board for Technical and Comprehensive Education operating through the Commission on Higher Education, shall develop better articulation of associate and baccalaureate degree programs. To comply with this requirement, the Commission upon the advice of the Council of Presidents established a Transfer Articulation Policy Committee composed of four-year institutions' vice presidents for academic affairs and the Associate Director for Instruction of the State Board for Technical and Comprehensive Education. The principal outcomes derived from the work of that committee and accepted by the Commission on Higher Education on July 6, 1995 were

- an expanded list of 72 courses which will transfer to four-year public institutions of South Carolina from the two-year public institutions,
- a statewide policy document on good practices in transfer to be followed by all public institutions of higher education in the State of South Carolina, which was accepted in principle by the Advisory Committee on Academic Programs and the Commission,
- six task forces on statewide transfer agreements, each based in a discipline or broad area of the baccalaureate curriculum.

In 1995 the General Assembly passed Act 137 which stipulated further that the South Carolina Commission on Higher Education "notwithstanding any other provision of law to the contrary, shall have the following additional duties and functions with regard to the various public institutions of higher education." These duties and responsibilities include the Commission's responsibility to "establish procedures for the transferability of courses at the undergraduate level between two-year and four-year institutions or schools."

Act 137 directs the Commission to adopt procedures for the transfer of courses from all two-year public to all four-year public institutions of higher education in South Carolina. Proposed procedures are listed below. Unless otherwise stated, these procedures shall become effective immediately upon approval by the Commission and shall be fully implemented, unless otherwise stated, by September 1, 1997.

Statewide Articulation of 72 Courses

1. The Statewide Articulation Agreement of 72 courses already approved by the South Carolina Commission on Higher Education for transfer from two- to four-year public institutions (See *Appendix A*) shall be applicable to all public institutions, in-

cluding two-year institutions and institutions within the same system. In instances where an institution does not have synonymous courses to ones on this list, it shall identify comparable courses or course categories for acceptance of general education courses on the statewide list.

Admissions Criteria, Course Grades, GPAs, Validations

2. All four-year public institutions shall issue annually in August a transfer guide covering at least the following items:

A. The definition of a transfer student and requirements for admission both to the institution and, if more selective, requirements for admission to particular programs.

B. Limitations placed by the institution or its programs for acceptance of standardized examinations (e.g., SAT, ACT) taken more than a given time ago, for academic coursework taken elsewhere, for coursework repeated due to failure, for coursework taken at another institution while the student is academically suspended at his/her home institution, and so forth.

C. Institutional and, if more selective, programmatic maximums of course credits allowable in transfer.

D. Institutional procedures used to calculate student applicants' GPAs for transfer admission. Such procedures shall describe how nonstandard grades (withdrawal, withdrawal failing, repeated course, etc.) are evaluated; and they shall also describe whether all coursework taken prior to transfer or just coursework deemed appropriate to the student's intended four-year program of study is calculated for purposes of admission to the institution and/or programmatic major.

E. Lists of all courses accepted from each technical college (including the 72 courses in the Statewide Articulation Agreement) and the course equivalencies (including "free elective" category) found on the home institution for the courses accepted.

F. Lists of all articulation agreements with any public South Carolina two-year or other institution of higher education together with information about how interested parties can access these agreements.

G. Lists of the institutions' Transfer Officer(s) personnel together with telephone and FAX numbers and office address.

H. Institutional policies related to "academic bankruptcy" (i.e. removing an entire transcript or parts thereof from a failed or underachieving record after a period of years has passed) so the re-entry into the four-year institution with course credit earned in the interim elsewhere is done without regard to the student's earlier record.

I. "Residency requirements" for the minimum number of hours required to be earned at the institution for the degree.

3. Coursework (individual courses, transfer blocks, statewide agreements) covered within these procedures shall be transferable if the student has completed the coursework with a "C" grade (2.0 on a 4.0 scale) or above, but transfer of grades does not relieve the student of the obligation to meet any GPA requirements or other admissions requirements of the institution or program to which application has been made.

A. Any four-year institution which has institutional or programmatic admissions requirements for transfer students with cumulative grade point averages (GPAs) higher than 2.0 on a 4.0 scale shall apply such entrance requirements equally to transfer students from regionally accredited South Carolina public institutions regardless of whether students are transferring from a four-year or two-year institution.

B. Any multi-campus institution or system shall certify by letter to the Commission that all coursework at all of its campuses applicable to a particular degree program of study is fully acceptable in transfer to meet degree requirements in the same degree program at any other of its campuses.

4. Any coursework (individual courses, transfer blocks, statewide agreements) covered within these procedures shall be transferable to any public institution without any additional fee and without any further encumbrance such as a "validation examination," "placement examination/instrument," "verification instrument," or any other stricture, notwithstanding any institutional or system policy, procedure, or regulation to the contrary.

Transfer Blocks, Statewide Agreements, Completion of the AA/AS Degree

5. The following Transfer Blocks/Statewide Agreements taken at any two-year public institution in South Carolina shall be accepted in their totality toward meeting baccalaureate degree requirements at all four-year public institutions in relevant four-year degree programs, as follows:

- Arts, Humanities, and Social Sciences—established curriculum block of 46–48 semester hours,
- Business Administration—established curriculum block of 46–51 semester hours,
- Engineering—established curriculum block of 33 semester hours,
- Science and Mathematics—established curriculum block of 48–51 semester hours,
- Teacher Education—established curriculum block of 38–39 semester hours for Early Childhood, Elementary, and Special Education students only. Secondary education majors and students seeking certification who are not majoring in teacher education should consult the Arts, Humanities, and Social Sciences or the Math and Science transfer blocks, as relevant, to assure transferability of coursework.
- Nursing—by statewide agreement, at least 60 semester hours shall be accepted by any public four-year institution toward the baccalaureate completion program (BSN) from graduates of any South Carolina public associate degree program in nursing (ADN), provided that the program is accredited by the National League of Nursing and that the graduate has successfully passed the National Licensure Examination (NCLEX) and is a currently licensed Registered Nurse.

(For complete texts and information about these statewide transfer blocks/agreements, see *Appendix B*.)

6. Any "unique" academic program not specifically or by extension covered by one of the statewide transfer blocks/agreements listed in #4 above shall either create its own transfer block of 35 or more credit hours with the approval of CHE staff or shall

adopt either the Arts/Social Science/Humanities or the Science/Mathematics block by September 1996. The institution at which such program is located shall inform the staff of the CHE and every institutional president and vice president for academic affairs about this decision.

7. Any student who has completed either an Associate of Arts or Associate of Science degree program at any public two-year South Carolina institution which contains within it the total coursework found in either the Arts/Social Sciences/Humanities Transfer Block or the Math/Science Transfer Block shall automatically be entitled to junior-level status or its equivalent at whatever public senior institution to which the student might have been admitted. (Note: As agreed by the Committee on Academic Affairs, junior status applies only to campus activities such as priority order for registration for courses, residence hall assignments, parking, athletic event tickets, etc. and not in calculating academic degree credits.)

Related Reports and Statewide Documents

8. All applicable recommendations found in the Commission's report to the General Assembly on the School-to-work Act (approved by the Commission and transmitted to the General Assembly on July 6, 1995) are hereby incorporated into the procedures for transfer of coursework among two- and four-year institutions. (See *Appendix C*.)

9. The policy paper entitled *State Policy on Transfer and Articulation*, as amended to reflect changes in the numbers of transfer blocks and other Commission action since July 5, 1995, is hereby adopted as the statewide policy for institutional good practice in the sending and receiving of all course credits to be transferred. (See *Appendix D*.)

Assurance of Quality

10. All claims from any public two- or four-year institutions challenging the effective preparation of any other public institution's coursework for transfer purposes shall be evaluated and appropriate measures shall be taken to reassure that the quality of the coursework has been reviewed and approved on a timely basis by sending and receiving institutions alike. This process of formal review shall occur every four years through the staff of the Commission on Higher Education, beginning with the approval of these procedures.

Statewide Publication and Distribution of Information on Transfer

11. The staff of the Commission on Higher Education shall print and distribute copies of these Procedures upon their acceptance by the Commission. The staff shall also place this document and the Appendices on the Commission's home page on the Internet under the title "Transfer Policies."

12. By September 1 of each year, all public four-year institutions shall on their own home page on the Internet under the title "Transfer Policies"

A. Print a copy of this entire document (without appendices).

B. Print a copy of their entire transfer guide.

C. Provide to the staff of the Commission in satisfactory format a copy of their entire transfer guide for placing on the Commission's home page on the Internet.

13. By September 1 of each year, the staff of the State Board for Technical and Comprehensive Education shall on its home page on the Internet under the title "Transfer Policies"

A. Print a copy of this document (without appendices).

B. Provide to the Commission staff in format suitable for placing on the Commission's home page on the Internet a list of all articulation agreements that each of the sixteen technical colleges has with public and other four-year institutions of higher education, together with information about how interested parties can access those agreements.

14. Each two-year and four-year public institutional catalog shall contain a section entitled "Transfer: State Policies and Procedures." Such section at a minimum shall

A. Publish these procedures in their entirety (except appendices).

B. Designate a chief Transfer Officer at the institution who shall

—provide information and other appropriate support for students considering transfer and recent transfers.

—serve as a clearinghouse for information on issues of transfer in the State of South Carolina.

—provide definitive institutional rulings on transfer questions for the institution's students under these procedures.

—work closely with feeder institutions to assure ease in transfer for their students.

C. Designate other programmatic Transfer Officer(s) as the size of the institution and the variety of its programs might warrant.

D. Refer interested parties to the institutional Transfer Guide.

E. Refer interested parties to the institution's and the Commission on Higher Education's home pages on the Internet for further information regarding transfer.

In order to comply with these state guidelines, the following information is noted relative to Clemson University:

Transfer Admissions Officers

Becky D. Pearson, Assistant Director of Admissions
Rhetta E. England, Transfer Credit Coordinator

105 Sikes Hall

Clemson University

Box 345124

Clemson, SC 29634-5124

Phone: (864) 656-2287

FAX: (864) 656-2464

Additional information regarding transfer is contained in the brochure *S. C. Technical College Transfer Guide*, available through the Office of Undergraduate Admissions at the address above. Prospective transfer students are also encouraged to refer to the University's home page on the Internet at www.clemson.edu or the South Carolina Commission on Higher Education's Web site at che400.state.sc.us.

College Board College-Level Examination Program (CLEP)

This program has very limited recognition at Clemson. A few departments accept credit for CLEP subject-matter examinations; however, CLEP General Examinations are not recognized. Credit is awarded for introductory-level courses according to criteria established by the following departments: Chemistry, English (composition only), and Mathematical Sciences (algebra and trigonometry only—applicable principally in agricultural curricula permitting use of MTHSC 105). Numerical scores plus essays, required when offered as part of a CLEP examination, will be evaluated by the appropriate department. CLEP is designed primarily for adults with nontraditional learning experiences.

ADMISSIONS DEPOSIT

With the exception of certain University scholarship recipients, all accepted freshman and transfer candidates are required to submit a nonrefundable \$100 admissions deposit. This deposit is applicable toward tuition and other University fees.

HOUSING

All 1999-2000 entering freshmen are guaranteed on-campus housing. The University housing policy requires all freshmen to live in University housing, in their own home, or with a close relative unless circumstances dictate otherwise. New transfer students entering Clemson in 1999 will be offered University housing if space is available.

ORIENTATION PROGRAMS

The University offers a series of orientation programs during the summer for freshmen, transfer students, and their parents. All accepted students are expected to attend one of the sessions. During orientation, students will have an opportunity to discuss their educational objectives with an advisor, to register for the fall semester, and to learn about student life and other co-curricular activities. Transfer students will have their transcripts evaluated and select appropriate courses for their first semester at Clemson. The student program fee is \$40 per student, subject to change.

The 1999 summer orientation dates for freshmen are June 21–22, 24–25, 28–29, July 1–2, 8–9, and 12–13. New transfer students may attend either the June 23 or July 14 program. Although students are strongly encouraged to attend summer orientation, abbreviated make-up sessions are also held on August 15 for freshmen and their parents and on August 16 for transfer students and their parents.

CAMPUS VISITS AND TOURS

The Visitors Center serves as a "front door" to the campus and offers a variety of informational services, including guided tours, audio-visuals, general and referral information, and publications about the University and surrounding area. The Visitors Center is located adjacent to the Alumni Center at the end of North Palmetto Boulevard. Hours of operation are Monday–Friday from 8:00 A.M. to 4:30 P.M., Saturday from 9:00 A.M. to 4:30 P.M., and Sunday

from 1:00 P.M. to 4:30 P.M. The Visitors Center is closed on University holidays and selected weekends during December and January.

Guided walking tours of the campus, which last about an hour, are led by students who are members of the all-volunteer University Guide Association. Tour times are Monday–Saturday at 9:45 A.M. and 1:45 P.M. and Sunday at 1:45 P.M. Tours begin and end at the Visitors Center. Visitors should try to arrive 10–15 minutes early. Tours are offered throughout the year except on University holidays. Reservations are accepted but not required. For more information, call (864) 656-4789.

INTERNATIONAL UNDERGRADUATES

Admissions services for undergraduate international students are provided by the Office of Undergraduate Admissions. International students who come from abroad or transfer from another school must meet academic, language and financial qualifications as determined by Clemson University. The SAT I or ACT is required of all international applicants (freshman or transfer). The Test of English as a Foreign Language (TOEFL) is required of applicants from countries where English is not the native language. Financial qualifications are determined by the submission of financial assessment and bank statements verifying adequate funding. Student visa services are provided by the Office of the Graduate School.

SPECIAL STUDENT STATUS

The special student classification is designed for high school graduates 19 years of age or older, who wish to take a limited number of courses for personal or professional development. This program is not appropriate for individuals who are interested in earning an undergraduate degree. In addition, it is not a "trial admission" status or one for candidates who apply too late to submit credentials for consideration for regular admission. Applicants denied regular admission to Clemson are not eligible to apply as special students.

None of the usual credentials supporting an application are required of such applicants. A maximum of 18 undergraduate credit hours can be taken during the regular or summer sessions.

READMISSION OF FORMER UNDERGRADUATES

Undergraduate students who have previously attended Clemson and wish to return must secure an application for reentrance from the Records and Registration Office. Students are readmitted into the major they were in when they last attended Clemson. Change of major forms are available in the Student Records Office. Former students must meet the catalog curriculum requirements for graduation in effect at the time of their return. Students are required to satisfy the University's general education requirements in addition to curricular requirements. Any variations in curricular requirements will be considered under the substitution procedures. If all work toward a degree is not completed within six years after entrance, the student may be

required to take additional courses. Other information can be obtained from the Records and Registration Office.

POSTBACCALAUREATE

Students may be accepted by the Graduate School as postbaccalaureate if they apply to a graduate degree program but do not have the appropriate academic background. Students must be recommended by the appropriate department or program chair and should meet all other requirements for admission to the degree program with respect to grade-point ratio and standardized test scores. Postbaccalaureate students who are denied admission because of failure to meet the minimum requirements have access to the same appeal procedure as any other students applying to the Graduate School.

Applicants will be classified as postbaccalaureate if they are not qualified to take at least one graduate course per semester which can be included in the minimum hours required for the graduate degree. Additionally, students required to complete eighteen or more semester hours of undergraduate credits will be classified as postbaccalaureate. The postbaccalaureate status will remain in effect until the number of required undergraduate credit hours is less than or equal to eighteen and the student is qualified to take, each semester, a graduate course which can be included in the minimum hours required for the graduate degree. Departments or students may request postbaccalaureate status even though the above criteria are satisfied.

Once postbaccalaureate students become eligible for classification as graduate students, the decision as to eventual admission status (full or provisional) will be made based on criteria utilized by the department and Graduate School for all other applicants to the degree program. Postbaccalaureate students are expected to maintain a B average and receive no grade lower than C to qualify for admission to a graduate program.

Postbaccalaureate students can enroll in the same number of credits per semester as undergraduate students but cannot enroll in graduate courses or receive graduate assistantships. No degree or certificate shall be awarded to students in a postbaccalaureate status, and such students who subsequently desire to obtain an additional baccalaureate degree must apply through the Office of Undergraduate Admissions. The applicability of credits earned toward the undergraduate degree will be determined by the policy pertaining to transfer students. Tuition and fees for postbaccalaureate students shall be those applicable to graduate students and are subject to out-of-state fees, if applicable.

Students possessing undergraduate degrees or graduate degrees who wish to enroll in undergraduate courses for reasons other than future admission to the Graduate School shall not be classified as postbaccalaureate and shall be governed by policies established by the Office of Admissions.

FINANCIAL INFORMATION

The annual State Appropriation Act imposes the general requirement that student fees be fixed by the University Board of Trustees. The Act imposes two specific requirements on the Board: (1) In fixing fees applicable to academic and general maintenance and operation costs, the Board must maintain a minimum student fee not less than the fee charged the previous year. (2) In fixing fees applicable to dormitory rental, dining halls, laundry, infirmary, and all other personal subsistence expenses, the Board must charge students an amount sufficient to fully cover the cost of providing such facilities and services.

The tuition and fees for all undergraduate students—full or part time, and auditing—are shown at right. Satisfactory settlement of all expenses is a requirement for completing each semester's class registration, and no student is officially enrolled until all past due accounts have been satisfied. Financial aid cannot be used to satisfy balances forward from a prior academic year.

In special cases the University will accept, at the beginning of a semester, a noninterest-bearing promissory note for a portion of the semester housing and semester meal plan fee. Amounts up to \$450 for room rent and \$450 for 5- or 7-day meal plans may be included in the note. In such cases, a note for the fall semester charges will be due October 1, and for the spring semester, March 1. Failure to pay the note when due will result in the assessment of late fees, including collection costs, denial of future deferred payment note privileges, and termination of board plan and/or cancellation of housing contract.

Currently enrolled students who expect to continue enrollment are given an opportunity to make housing reservations by paying a \$95 housing advance payment and by signing up on the computer during the spring semester at a time designated by the Housing Office.

New students who are offered on-campus housing accommodations must pay a nonrefundable \$25 application fee and a \$100 admissions deposit. The admissions deposit is deducted from the amount otherwise due for the first semester expenses.

TUITION AND FEES

Late Enrollment Service Charge

Registration for classes is scheduled for specific days, and definite procedures are outlined to avoid the problems incident to late registration. A student has not completed registration until all required steps have been taken. Any student failing to complete registration on the specified class registration days will incur a late enrollment charge, which begins at \$25 and increases \$5 each day.

Full-time Fees

Undergraduates and graduate students must be enrolled in 12 semester hours to pay full-time fees. Students enrolled in less than 12 hours or who drop below 12 hours may become ineligible for some student services, financial aid, or other programs.

TUITION AND FEES

Actual Charges for 1999-2000 are not known when the catalog is printed. The charges reflected below are for 1998-99 and are subject to change as conditions warrant.

	Resident Per Semester	Nonresident Per Semester
Full-time academic fee	\$1,577.00	\$4,455.00
Part-time academic fee (per semester hour)	130.00	374.00
Auditing academic fee (per semester hour)	65.00	132.00
Staff academic fee (per semester hour; first 4 hours free)	130.00	130.00
Graduate assistant academic fee	493.00	493.00
Laboratory fee (per laboratory); nonrefundable after last day to add	25.00	25.00
Health fee (Must be paid by any student enrolled for 7 or more hours)	95.00	95.00

Residence Halls (per semester)	Regular	Single
Johnstone Hall (Sections A, D-F)	810.00	1,215.00
Benet, Bowen, Bradley, Cope, Donaldson, Geer, Johnstone (Annexes A-F), Norris, Sanders, Wannamaker, Young	930.00	1,395.00
Barnett, Byrnes, Lever, Manning, Smith, Mauldin	1,025.00	1,538.00
Clemson House (room)	1,010.00	1,515.00
Clemson House (apartments)	1,050.00	1,575.00
Thornhill Village (four occupants)	1,110.00	1,665.00
Calhoun Courts Apartments (four occupants)	1,245.00	1,868.00
Lightsey Bridge Apartments	1,280.00	1,920.00
Holmes and McCabe	1,185.00	1,778.00
Temporary Housing		890.00
Family Housing		Per Month
Townhouses		290.00
Duplex-2 Bedroom		315.00
Duplex-3 Bedroom		365.00
Faculty Houses		385.00
Faculty Houses (Renovated)		495.00
Thornhill Graduate Apartments		
9 month		345.00
12 month		315.00
Board Plans ¹		Per Semester
Unlimited Access (21 meals), Monday-Sunday		937.00
Any 15 (15 meals), Monday-Sunday		870.00
Five-Day (15 meals), Monday-Friday		797.00
Any 10 (10 meals), Monday-Sunday		786.00
Commuter 5 (lunch only), Monday-Friday		398.00
Commuter 40 (any 40 meals per semester)		211.00
Tiger Stripe Account (declining balance account)		50.00

¹All first-year freshmen who live in University housing (excluding Calhoun Courts, Clemson House Apartments, Lightsey Bridge Apartments, and Thornhill Village) are required to subscribe to one of the four regular meal plans for their first two semesters. All other students have the option of selecting a semester basis or paying the prevailing cash price for individual meals. The Commuter 5, Commuter 40, and Tiger Stripe Account do not satisfy the freshman requirement.

Part-time Fees

Undergraduate and graduate students taking less than 12 semester credit hours will be charged each semester according to the above schedule. These fees do not provide for admission to athletic events, concert series, and other such activities.

Returned Checks

A check or charge card given in payment of University expenses or a check cashed by the University that is returned unpaid by the bank immediately creates an indebtedness to the University. The Office of Business Affairs, G-12 Sikes Hall, administers matters related to the collection of all returned checks for students and nonstudents.

The Bursar's Office will redeposit returned checks in payment of academic fees for the fall and spring semesters. A \$20 returned check charge will be assessed for each returned item in accordance with state laws. Students with returned items for payment of academic fees are also subject to a late payment fee of \$5 per calendar day, not to exceed \$350, beginning on the day after the last day of late registration. If the note was returned to the University in a timely manner with no response by the student or drawer, a written request to disenroll the student may be made to the Registrar. If the request is approved, the percentage of refund will be applied to the debt. If the check is returned after the mid-point of the semester with no response, a decision will be made by the Director of Business Affairs and the Registrar as to the effects of dis-

enrollment. At this point, the student will owe 100% of tuition and fees, even if he/she has been disenrolled. The University may restrict subsequent payment for academic and other fees by accepting only cash, certified checks, cashier's checks, or money orders.

Any individual who cashes a two-party check or uses a two-party check for payment of University expenses will be held responsible for that check if it is returned unpaid by the bank. Checks used as payment for various University services, such as meal plans, housing, etc., that are later returned unpaid by the bank, give the University the right to cancel such services and cause forfeiture of any refund.

Any returned check not collected by the above procedures may be turned over to a collection agency and the indebtedness reported to a credit bureau. Costs of collection will be added to the debt. Transcripts and diplomas will be withheld pending payment, and the debt may be deducted from state income tax refunds.

Abuse of check cashing and check payment privileges may result in the restriction of such privileges for an indefinite period of time based on the frequency and/or dollar amount, as determined by the Business Affairs Office.

Past Due Accounts

Any indebtedness to the University which becomes past due immediately jeopardizes the student's enrollment, and no such student will be permitted to re-enroll for an ensuing semester or summer school term. Billing fees and/or collection costs may be added to the indebtedness. Further, any student who fails to pay all indebtedness, including collection costs, to the University may not be issued a transcript or diploma. Unresolved debts may be turned over to a collection agency, be reported to a credit bureau and deducted from state income tax refunds. Debts include but are not limited to the following: parking violations, library fines, rent, academic fees, and others.

Refund of Academic Fees

(Tuition, University Fee, and Medical Fee) for Students Withdrawing, Dropping to Part Time, or Part-time Students Dropping Credit Hours. No refunds will be made on a semester's tuition and fees after four weeks from the last day to register. In the case of a withdrawal from the university, refunds will be based on the effective date of the withdrawal. In the case of a withdrawal from a course, refunds will be based on the date the student drops the course using the online registration system. To be eligible for a refund, the student's request must be received by the Office of Business Affairs prior to the beginning of the next fall/spring semester or subsequent summer term. Beginning with the day following the last day to register, refunds for periods of four weeks or less during fall/spring semester shall be made on the following basis:

Fall/Spring Semester				
Period of Enrollment	Percent Refund			
Registration day(s) in published calendar	100%			
After Late Registration:				
One week or less	80%			
More than 1 but not more than 2 weeks	60%			
More than 2 but not more than 3 weeks	40%			
More than 3 but not more than 4 weeks	20%			
More than 4 weeks	0%			

Summer Sessions				
Less Than 3 Weeks	3 Weeks	5 or 6 Weeks	More Than 6 Weeks	
Registration day(s) in published calendar	100%	100%	100%	100%
After Late Registration:				
One week or less	0%	40%	60%	60%
More than 1 but not more than 2 weeks	0%	0%	20%	40%
More than 2 but not more than 3 weeks	0%	0%	0%	20%
More than 3 weeks	0%	0%	0%	0%

Refund of Dining Hall and Residence Hall Fees

Specific information relating to living-expense refunds is given in the sections on Housing and Student Food Service.

Refunds of Financial Aid for Students Withdrawing from the University

Refunds of academic fees are made in accordance with semester and summer session refund policies. First semester freshmen and first semester transfers receiving Title IV financial aid are under a different policy based on federal guidelines. Details are available at G-08 Sikes Hall. University housing refunds are made according to the housing contract. Meal-plan refunds are made on a pro rata basis.

Since financial aid is expected to meet or help meet educational costs, any academic fee, housing, or meal-plan fee for students withdrawing from the University up to the amount of financial aid received for that semester or summer session, will be refunded to the Financial Aid Program(s) from which the student received assistance.

To determine the amount of refund that will be returned to Federal Title IV Aid Programs and what amount will be returned to the non-Title IV Aid Programs, the following formula will be used:

$$\begin{aligned} \text{Federal Title IV Refund} &= \\ & \left(\text{Amount of Refund} \right) \times \frac{\text{Title IV Aid Received}}{\text{Total Aid Received}} \\ \text{Non-Title IV Refund} &= \text{Amount of Refund minus} \\ & \quad \text{Title IV Refund} \end{aligned}$$

In refunding monies to the various Financial Aid Programs, the following priority listings will be used:

- A. Title IV Federal Programs
 1. Federal Stafford Loans (unsubsidized)
 2. Federal Stafford Loans (subsidized)
 3. Federal Plus Loans
 4. Federal Perkins Loans
 5. Federal Pell Grants
 6. Federal Supplemental Educational Opportunity Grants
 7. South Carolina State Grants
 8. Other Title IV Programs
- B. Non-Title IV Programs
 1. Institutional Loans
 2. Institutional Scholarships and/or Grants
 3. Private Loans/Scholarships

After the refund has been applied to the Title IV and non-Title IV programs, any refund balance will be refunded to the student.

If debts were incurred before withdrawing, such as bad checks, unpaid traffic fines, library fines, and others, the refund will cover these obligations first. Academic fees, housing, and meal-plan refunds for students withdrawing will be paid to the student.

Transcripts

Official transcripts are issued only at the authorized, written request of the student. Requests must be made to the Transcript Office, 104 Sikes Hall, Box 345125, Clemson, SC 29634-5125. Payment must be made in advance and can be made by Visa, MasterCard, Discover, Tiger Stripe, check (payable to Clemson University), or cash. The following must be included with the transcript request: full name (including any names used while at Clemson), social security number, current address, date of birth, date the student last attended Clemson, where the transcript is to be sent, and payment of \$5 per transcript. Telephone requests will not be honored. Transcript requests are normally processed within 48 hours, but additional processing time may be required at the end of a semester. Information is available from the Student Records Office at the address above or by telephone at (864) 656-2173. Official transcripts are not issued for those who are indebted to the University.

RESIDENT TUITION AND FEES

Application for Resident Status

Any undergraduate student or prospective student whose status concerning entitlement to payment of in-state tuition and fees is uncertain has the responsibility of securing a ruling from the University by providing all relevant information on special application forms. These forms can be obtained from the Office of Admissions and Registration, 103 Sikes Hall and are to be completed and returned to that office at least two weeks prior to registration for any semester or summer term for which the student is attempting to qualify for payment of the in-state tuition and fee rate.

Entitlement

Eligibility for payment of in-state tuition and fees shall be determined under the provisions of Sections 59-112-10 through 59-112-100, South Carolina Code of Laws, 1976, as amended. This law is set forth in its entirety as

follows (subject to further amendment by the General Assembly).

Statutes

Definitions—Section 59-112-10. As used in this chapter:

A. The words "State Institution" shall mean those post-secondary educational institutions under the jurisdiction of the following: (1) Board of Trustees, Clemson University; (2) Board of Trustees, Medical University of South Carolina; (3) Board of Trustees, South Carolina State College; (4) State College Board of Trustees; (5) Board of Visitors, The Citadel; (6) Board of Trustees, University of South Carolina; (7) Board of Trustees, Winthrop College; and (8) State Board of Technical and Comprehensive Education.

B. The word "student" shall mean any person enrolled for studies in any state institution.

C. The word "residence" or "reside" shall mean continuous and permanent physical presence within this State, provided, that temporary absences for short periods of time shall not affect the establishment of a residence.

D. The word "domicile" shall mean a person's true, fixed, principal residence and place of habitation; it shall indicate the place where such person intends to remain, and to which such person expects to return upon leaving without establishing a new domicile in another state. For purposes of this section one may have only one legal domicile; one is presumed to abandon automatically an old domicile upon establishing a new one. Housing provided on an academic session basis for students at State institutions shall be presumed not to be a place of principal residence, as residency in such housing is by nature temporary.

E. The words "in-state rates" shall mean charges for tuition and fees established by State Institutions for persons who are domiciled in South Carolina in accordance with this act; the words "out-of-state rates" shall mean charges for tuition and fees established by State Institutions for persons not domiciled in South Carolina in accordance with this act.

F. The words "independent person" shall mean a person in his majority, or an emancipated minor, whose predominant source of income is his own earnings or income from employment, investments, or payments from trusts, grants, scholarships, loans, or payments of alimony or separate maintenance made pursuant to court order.

G. The words "dependent" or "dependent person" mean: (1) one whose financial support is provided not through his own earnings or entitlements, but whose predominant source of income or support is payments from a parent, spouse, or guardian, and who qualifies as a dependent or an exemption on the federal tax return of the parent, spouse, or guardian; or (2) one for whom payments are made, under court order, for child support and the cost of his college education by an independent person meeting the provisions of Section 59-112-20 A or B. However, the words "dependent" or "dependent person" do not include a spouse or former spouse who is the recipient of alimony or separate maintenance payments made pursuant to court order.

H. The word "minor" shall mean a person who has not attained the age of eighteen years; and the words "emancipated minor" shall mean a minor whose parents have entirely surrendered the right to

the care, custody and earnings of such minor and are no longer under any legal obligation to support or maintain such minor.

I. The word "parent" shall mean a person's natural or adoptive father or mother; or if one parent has custody of the child, the parent having custody; or if there is a guardian or other legal custodian of such person, then such guardian or legal custodian; provided, however, that where circumstances indicate that such guardianship or custodianship was created primarily for the purpose of conferring South Carolina domicile for tuition and fee purposes on such child or dependent person, it shall not be given such effect.

J. The word "spouse" shall mean the husband or wife of a married person.

South Carolina Domicile Defined for Purposes of Rates of Tuition and Fees—Section 59-112-20. South Carolina Domicile for tuition and fee purposes shall be established as follows in determinations of rates of tuition and fees to be paid by students entering or attending State Institutions:

A. Independent persons who reside in and have been domiciled in South Carolina for a period of no less than twelve months with an intention of making a permanent home herein, and their dependents, may be considered eligible for in-state rates.

B. Independent persons who reside in and have been domiciled in South Carolina for fewer than twelve months but who have full-time employment in the State, and their dependents, may be considered eligible for in-state rates for as long as such independent person is employed on a full-time basis in the State.

C. Where an independent person meeting the provisions of Section 59-112-20 B above, is living apart from his spouse, or where such person and his spouse are separated or divorced, the spouse and dependents of such independent person shall have domiciliary status for tuition and fee purposes only under the following circumstances: (1) if the spouse requesting domiciliary status for tuition and fee purposes remains domiciled in South Carolina although living apart or separated from his or her employed spouse; (2) if the dependent requesting domiciliary status for tuition and fee purposes is under the legal custody or guardianship, as defined in Section 59-112-101 above, of an independent person who is domiciled in this State; or if such dependent is claimed as an income tax exemption by the parent not having legal custody but paying child-support, so long as either parent remains domiciled in South Carolina.

D. The residence and domicile of a dependent minor shall be presumed to be that of the parent of such dependent minor.

Effect of Change of Residency—Section 59-112-30. When the domicile of a student or of the person upon whom a student is financially dependent changes after enrollment at a State Institution, tuition charges shall be adjusted as follows:

A. Except as provided in Section 59-112-20B above, when domicile is taken in South Carolina, a student shall not become eligible for in-state rates until the beginning of the next academic session after expiration of twelve months from date of domicile in this State.

B. When South Carolina domicile is lost, eligibility for in-state rates shall end on the last day of

the academic session in which the loss occurs; however, application of this subsection shall be at the discretion of the institution involved.

C. Notwithstanding the other provisions of this section, any dependent person who has been domiciled with his family in South Carolina for a period of not less than three years immediately prior to his enrollment may enroll in a state-supported institution of higher learning at the in-state rate and may continue to be enrolled at such rate even if the parent, spouse, or guardian upon whom he is dependent moves his domicile from this State.

Effect of Marriage—Section 59-112-40. Except as provided in Section 59-112-20 above, marriage shall affect determinations of domicile for tuition and fee purposes only insofar as it operates to evince an intention by the parties to make a permanent home in South Carolina.

Military Personnel and Their Dependents—Section 59-112-50. Notwithstanding other provisions of this act, during the period of their assignment to duty in South Carolina members of the armed services of the United States stationed in South Carolina and their dependents may be considered eligible for in-state rates. When such armed service personnel are ordered away from the State, their dependents may continue for an additional twelve months to have this eligibility at the State Institutions where they are enrolled at the time such assignment ends. Such persons and their dependents may be considered eligible for in-state rates for a period of twelve months after their discharge from the armed services even though they were not enrolled at a State Institution at the time of their discharge, if they have evinced an intent to establish domicile in South Carolina and if they have resided in South Carolina for a period of at least twelve months immediately preceding their discharge.

Faculty, Administrative Employees and Dependents Thereof—Section 59-112-60. Full-time faculty and administrative employees of State Institutions, and the spouses and children of such persons, shall be excluded from the provision of this act.

Abatement of Rates for Nonresidents on Scholarship—Section 59-112-70. Notwithstanding other provisions of this act, the governing boards listed in Section 59-112-10A above, are authorized to adopt policies for the abatement of any part or all of the out-of-state rates for students who are recipients of scholarship aid.

Administration of Chapter; Burden of Proving Eligibility of Students—Section 59-112-80. Each State Institution shall designate an official to administer the provisions of this act. Students making application to pay tuition and fees at in-state rates shall have the burden of proving to the satisfaction of the aforesaid officials of State Institutions that they have fulfilled the requirements of this act before they shall be permitted to pay tuition and fees at such rate.

Penalties for Willful Misrepresentation—Section 59-112-90. Where it appears to the satisfaction of officials charged with administration of these provisions that a person has gained domiciliary status improperly by making or presenting willful misrepresentations of fact, such persons should be charged tuition and fees past due and unpaid at the out-of-state rate, plus interest at a rate of eight percent per

annum, plus a penalty amounting to twenty-five percent of the out-of-state rate for one semester; and until these charges have been paid no such student shall be allowed to receive transcripts or graduate from any State Institution.

Regulations—Section 59-112-100. The Commission on Higher Education may prescribe uniform regulations for application of the provisions of this act and may provide for annual review of such regulations.

Regulatory Guidelines

Commission on Higher Education, Chapter 62. Statutory Authority: 1976 Code Sections 59-112-10 to 59-112-100, Determination of Rates for Tuition and Fees.

Rates of Tuition and Fees—Section 62-600.

A. Resident classification is an essential part of fee determination, admission regulations, and other relevant policies of State Institutions. It is important that such institutions have fair and equitable regulations which can be administered consistently and are sensitive to the interests of both students and the State. The Commission on Higher Education hereby establishes regulations for the Statute Governing Residency and Tuition for Fee Purposes to be applied consistently by all South Carolina institutions of higher education. These regulations do not address residency matters relating to either in-county or international categories used within the State's technical colleges.

B. Institutions of higher education are required by the Statute to determine the residence classification of applicants. The initial determination of one's resident status is made at the time of admission. The determination made at that time, and any determination made thereafter, prevails for each subsequent semester until the determination is successfully challenged. The burden of proof resides with the students to show evidence as deemed necessary to establish their residency status.

Code of Laws Governing Residence—Section 62-601.

A. The rules regarding the establishment of legal residence for tuition and fee purposes for institutions of higher education are governed by the South Carolina Code of Laws.

B. As prescribed by the code, residence for tuition and fee purposes can be established by (1) independent persons, (2) dependent persons, and (3) independent immigrants, or dependent immigrants

Definitions—Section 62-602.

A. A "resident student" for tuition and fee purposes is defined as an independent person who has abandoned all prior domiciles and has been domiciled in South Carolina continuously for at least twelve months immediately preceding the first day of classes of the term for which resident classification is sought and for whom there is an absence of such evidence in other states or countries, notwithstanding other provisions of the statute. In the instances of dependent students and their families who are citizens or permanent residents, the domicile of the spouse, parent, and/or guardian for at least the twelve months immediately preceding the first day of classes of the term for which resident classification is sought is considered in determining residency status.

B. "Reside" is defined as continuous and permanent physical presence within the State, provided that temporary absences for short periods of time shall not affect the establishment of residence. Temporary absences shall be absences which are thirty days or less. Excluded are absences associated with requirements to complete a degree, absences for military training service, and like absences, provided South Carolina domicile is maintained. Absences of more than thirty days may affect the establishment or maintenance of residence for tuition and fee purposes. In the instance of dependents, except for nonresident aliens, where the spouse, parent and/or guardian "reside" will be considered in determining residency status.

C. "Domicile" is defined as true, fixed, principal residence and place of habitation, indicating where a person intends to remain, or to where one expects to return when away. Generally, an applicant must be domiciled in the State for twelve months for residency consideration.

D. "Majority Person" is defined as one in his/her majority (eighteen years of age or older), whose predominant source of income is his/her own earnings or income from employment, investments, or payments from trusts, grants, scholarships, loans, or payments made in accordance with court order. An independent person must provide more than half of his/her support during the twelve months immediately prior to the date that classes begin for the semester for which resident status is requested and cannot be claimed as a dependent or exemption on the federal tax return of his/her parent, spouse, or guardian for the year in which resident status is requested.

E. "Dependent Person" is defined as one whose predominant source of income or support is from payments from a parent, spouse, or guardian and who qualifies for and is claimed as a dependent or exemption on the federal income tax return of the parent, spouse, or guardian. A dependent person is also one for whom payments are made, under court order, for child support and the cost of the dependent person's college education.

F. "Terminal Leave" is defined as a transition period following active employment and immediately preceding retirement (with a pension or annuity), during which the individual may use accumulated leave.

G. "Immediately Prior" is defined as a period of time not exceeding ninety days and immediately preceding the first day of classes for the term in question.

H. "Continue to be Enrolled" is defined as continuous enrollment without an interruption that would require the student to pursue a formal process of readmission to that institution. Formal petitions of applications for change of degree level shall be considered readmissions.

I. "Nonresident Alien" is defined as a person who is not a citizen or permanent resident of the United States. By virtue of their nonresident status "nonresident aliens" generally do not have the capacity to establish domiciles in South Carolina.

J. "Academic Session" is defined as a term or semester of enrollment.

Citizens and Permanent Residents—Section 62-603.

A. Independent persons who have physically resided and been domiciled in South Carolina for

twelve continuous months immediately preceding the date the classes begin for the semester for which resident status is claimed may qualify to pay in-state fees. The twelve-month residency period does not start until the independent person begins to take steps which indicate that the independent person intends to establish a permanent home in the State. Absences from the State for more than thirty days during the twelve-month period may affect the establishment of permanent residence for fee and tuition purposes. Steps an independent person should take to establish a permanent home in South Carolina are listed in the section entitled "Establishing the Requisite Intent to Become a South Carolina Domiciliary."

B. The resident status of a dependent person is based on the resident status of the person who provides more than half of the dependent person's support and claims the dependent person as a dependent for federal income tax purposes. The residence and domicile of a dependent minor and other dependent person shall be presumed to be that of their parent(s), spouse, or guardian(s).

C. In the case of divorced or separated parents, the resident status of the dependent person may be based on the resident status of the parent who supports and/or claims the dependent person as a dependent for tax purposes, or it may be based on the resident status of the parent who has legal custody of the dependent person.

Nonresident Aliens, Noncitizens, and Nonpermanent Residents—Section 62-604.

A. Except as otherwise specified in this section, all noncitizens and nonpermanent residents of the United States will be assessed tuition and fees at the nonresident, out-of-state rate. Independent aliens, including refugees, untainted, and parolees and their dependents, may be entitled to resident, in-state classification once they have been awarded permanent resident status by the U.S. Department of Justice and meet all the statutory residency requirements provided that all other domiciliary requirements are met. Time spent living in South Carolina immediately prior to the awarding of permanent resident status may not be counted towards the twelve month residency period. Certain nonresident aliens present in the United States in specific visa classification may be granted in-state residency for tuition and fee purposes as prescribed by the Commission on Higher Education.

B. The *Adviser's Manual of Federal Regulations Affecting Foreign Students and Scholars* will serve as the primary resource reference for defining visa categories.

Establishing the Requisite Intent to Become a South Carolina Domiciliary—Section 62-605.

A. Residence status may not be acquired by an applicant or student while residing in South Carolina for the sole purpose of enrollment in an institution or for access to state-supported programs designed to serve South Carolina residents.

B. If a person asserts that his/her domicile has been established in this State, the individual has the burden of proof. Such persons should provide to the designated residency official any and all evidence which the person believes satisfies the burden of proof. The residency official will consider any and all evidence provided concerning such claim of domicile but will not necessarily regard any single item of evidence as conclusive evidence that domicile has been established.

C. For independent persons, examples of intent to become a South Carolina resident may include, although any single indicator may not necessarily be conclusive, indicia as listed below. The absence of indicia in other states is required before the student is eligible to pay in-state rates. Indicia may include the following:

- 1) statement of full-time employment;
- 2) possession of a valid South Carolina voter registration card and voting in South Carolina elections;
- 3) designating South Carolina as state of legal residence on military record;
- 4) possession of a valid South Carolina driver's license, or if a nondriver, a South Carolina identification card;
- 5) possession of a valid South Carolina vehicle registration card;
- 6) continuous presence in South Carolina during periods when not enrolled as a student;
- 7) paying South Carolina income taxes as a resident during the past tax year, including income earned outside of South Carolina from the date South Carolina domicile was claimed;
- 8) ownership of principal residence in South Carolina; and
- 9) licensing for professional practice (if applicable) in South Carolina.

D. These indicia will likewise be considered for spouses, parents, and guardians of dependent persons who wish to establish South Carolina domicile. As noted under "Citizens and Permanent Residents" above, the resident status of a dependent person matches that of the person who provides more than half of the dependent person's support and claims the dependent person as a dependent for federal income tax purposes.

Maintaining Residence—Section 62-606.

A. A person's temporary absence from the State does not necessarily constitute loss of South Carolina residence unless the person has acted inconsistently with the claim of continued South Carolina residence during the person's absence from the State. The burden is on the person to show retention of South Carolina residence during the person's absence from the State. Steps a person should take to retain South Carolina resident status for fee and tuition purposes include continuing to use a South Carolina permanent address on all records; retaining South Carolina voter's status; voting by absentee ballot; maintaining South Carolina driver's license; maintaining South Carolina vehicle registration; satisfying South Carolina resident income tax obligation. Individuals claiming permanent residence in South Carolina are liable for payment of income taxes on their total income from the date that they established South Carolina residence. This includes income earned in another state or country.

B. South Carolina residents (and their dependents) who serve in the military may continue to be eligible to pay in-state fees as long as they continuously claim South Carolina as their state of legal residence during their military service. South Carolina residents who change their state of legal residence while in the military lose their South Carolina resident status for fee and tuition purposes. To re-establish their South Carolina resident status, such persons must take steps which indicate that they plan to re-establish permanent residence in the State. These persons must then physically reside in the State for twelve continuous months.

Effect of Change of Residency—Section 62-607.

A. Notwithstanding other provisions of this section, any dependent person, except as otherwise excluded, who has been domiciled with his/her family in South Carolina for a period of not less than three years immediately prior to enrollment at state-supported colleges and universities may enroll in those institutions of higher learning at in-state rates and may continue to be enrolled at such rates even if the person upon whom he/she is dependent moves his/her domicile from this State.

B. If a dependent or independent person has been domiciled in South Carolina for less than three years, eligibility for in-state rates shall end on the last day of the academic session during which domicile is lost.

Effect of Marriage—Section 62-608.

A. In ascertaining domicile of a married person, irrespective of gender, such a review shall be determined just as for an unmarried person by reference to all relevant evidence of domiciliary intent.

B. If a nonresident marries a South Carolina resident, the nonresident does not automatically acquire South Carolina resident status. The nonresident may acquire South Carolina resident status if the South Carolina resident is an independent person and the nonresident is a dependent of the South Carolina resident.

C. Marriage to a person domiciled outside South Carolina shall not be solely the reason for precluding a person from establishing or maintaining domicile in South Carolina and subsequently becoming eligible or continuing to be eligible for residency.

D. No person shall be deemed solely by reason of marriage to a person domiciled in South Carolina to have established or maintained domicile in South Carolina and consequently to be eligible for or to retain eligibility for South Carolina residency.

Exclusions—Section 62-609.

A. Persons in the following categories may qualify to pay in-state fees without having to establish a permanent home in the State for twelve months. Persons who qualify under any of these categories must meet the conditions of the specific category on or before the first day of classes of the term for which payment of in-state fees is requested.

1) "Military Personnel and their Dependents": Members of the United States Armed Forces (and their dependents) who are stationed in South Carolina on active duty may be considered eligible to pay in-state fees. "Armed Forces" shall mean the United States Air Force, Army, Marine Corps, and Navy. When such personnel are ordered away from the State, their dependents may continue to pay in-state fees for an additional twelve months. Such persons (and their dependents) may also be eligible to pay in-state fees for a period of twelve months after their discharge from the military, provided they have demonstrated an intent to establish a permanent home in South Carolina and they have resided in South Carolina for a period of at least twelve months immediately preceding their discharge. Military personnel who are not stationed in South Carolina and/or former military personnel who intend to establish South Carolina residency must fulfill the twelve month "physical presence" requirement for them or their dependents to qualify to pay in-state fees.

2) "Faculty and Administrative Employees, and their Dependents": Full-time faculty and administrative employees of South Carolina state-supported

colleges and universities are eligible to pay in-state fees. Dependents of such persons are also eligible.

3) "Residents with Full-Time Employment and their Dependents": Persons who reside, are domiciled, and are full time employed in the State and will continue to work full time until they meet the twelve-month requirement are eligible to pay in-state fees, provided that they have taken the steps to establish a permanent home in the State (see "Establishing the Requisite Intent to Become a South Carolina Domiciliary"). The dependents of such persons are also eligible.

4) "Retired Persons": Retired persons who are receiving a pension or annuity who reside in South Carolina and have been domiciled in South Carolina as prescribed in the Statute for less than a year may be eligible for in-state rates and State-supported aid if they maintain residence and domicile in this State.

Persons on terminal leave who have established residency in South Carolina may be eligible for in-state rates even if domiciled in the State for less than one year, if they present documentary evidence for their employer showing they are on terminal leave. The evidence should show beginning and ending dates for the terminal leave period and that the person will receive a pension or annuity when he/she retires.

B. Full-time employment shall mean employment which consists of at least thirty-seven and a half hours a week on a single job in a full-time status. However, a person who works less than thirty-seven and a half hours a week but receives or is entitled to receive full-time employee benefits shall be considered to be employed full time.

C. Persons participating in Southern Regional Education Board-sponsored programs, including the Contract for Services and the Academic Common Market programs, must have continuously resided in the State for other than educational purposes for the two years immediately preceding application for consideration and must meet all residency requirements during this two-year period.

Application for Change of Resident Status—Section 62-610.

A. Persons applying for a change of resident classification must complete a residency application/petition and provide supporting documentation prior to a reclassification deadline as prescribed by the institution.

B. The burden of proof resides with those persons applying for a change of resident classification who must show required evidence to document the change in resident status.

Incorrect Classification—Section 62-611.

A. Persons incorrectly classified as residents are subject to reclassification and to payment of all non-resident fees not paid. If incorrect classification results from false or concealed facts, such persons may be charged tuition and fees past due and unpaid at the out-of-state rate. The violator may also be subject to administrative, civil, and financial penalties. Until these charges are paid, such persons will not be allowed to receive transcripts or graduate from a South Carolina institution.

B. Residents whose resident status changes are responsible for notifying the Residency Official of such changes.

Inquiries and Appeals—Section 62-612.

A. Inquiries regarding residency requirements and determinations should be directed to the institutional residency official.

B. Each institution will develop an appeals process to accommodate persons wishing to appeal residency determinations made by the institution's residency official. Neither the primary residency official nor appellate official(s) may waive the provisions of the Statute governing residency for tuition and fee purposes.

Appeals should be sent to the Senior Vice Provost, 101 Sikes Hall.

FOOD SERVICE

The University provides several economical meal plans. Harcombe and Schilleter dining halls feature an unlimited seconds policy, except on selected entrees, while Clemson House dining room, Canteen and Fernow Street Cafe serve meals on a la carte basis. Students dining at the Clemson House may use the meal card as a cash equivalency or for a presigned meal at no additional cost. Meals may also be purchased on a cash basis or with the Tiger Stripe account (declining balance account).

The "branding" concept in dining facilities is available on the Clemson campus. Li'l Dino Subs and Taco Bell Express are located at the East Campus Convenience Store; Chick-fil-A is located at the Union Canteen; and the Pizza Hut Express is at the Fernow Street Cafe. All of these dining facilities accept the Tiger Stripe Account and cash.

Students may choose one of several meal plans. These are outlined in the Clemson Dining Service brochure. Meal plans begin immediately after a student obtains a meal plan at the beginning of the semester and end after the evening meal on the day of graduation at the end of each semester.

All first-year freshmen who live in University housing, excluding Calhoun Courts, Clemson House Apartments, Thornhill Village and Lightsey Bridge Apartments, are required to subscribe to one of the following meal plans: Unlimited Access, Any Fifteen, Five Day, or Any Ten for their first two semesters. All other students may choose a meal plan on a semester basis or pay for individual meals. First-year freshmen living in University housing (excluding the aforementioned housing) may terminate this agreement for one of the following reasons:

- withdrawal from the University.
- change in housing assignment to an apartment with kitchen facilities.
- medical condition with dietary requirements that cannot be met by Dining Services. Documentation from a medical doctor must be provided along with specific dietary requirements. This documentation will be reviewed by the Dining Services Food Service Administrator.
- other circumstances determined by the University to be beyond the student's control.

Students must provide the necessary documentation for any of the above reasons before cancellation of this contract will be considered. Upperclassmen may terminate this agreement for any reason. Failure to participate in a meal plan does not automatically release a student from the meal contract.

Students may change meal plans at the billing of spring semester fees with no service charge. Students may change meal plans after the first two weeks and prior to the last six weeks of the semester by paying a \$25 service charge. Changes may be made at the Tiger 1 Card Office in Harcombe Dining Hall on Mondays only. All adjustments will be prorated, except for students withdrawing from the University. Students may upgrade during the registration period.

Contracts canceled for any reason after service of the first meal will result in a refund of advance payment minus a \$50 termination charge and a weekly charge for meals available. The meals available charge applies to the meals that have been served, not those that have been eaten by the individual student. No refunds will be made the last six weeks of any semester. Requests for refunds may be made at the Tiger 1 Card Office in Harcombe Dining Hall.

TIGER STRIPE ACCOUNT

Under the Tiger Stripe account program, monies are deposited into an account prior to usage. The Tiger Stripe account is equivalent to a prepaid credit card. As meals or other items are purchased from dining facilities, post office, CATS, bookstore, telecommunications, Redfern Health Center, East Campus Store, Agricultural Products Sales Center, Union Copy Center, Edgar's Game Room, vending machines, or laundry, the amount spent is deducted from the Tiger Stripe account balance. All students are eligible. (First-year freshmen may participate in the Tiger Stripe account program in addition to the required meal contract.) There is a \$50 minimum deposit required to open a Tiger Stripe account.

Additions to the Tiger Stripe account after registration must be made in amounts of at least \$5. Tiger Stripe accounts are not refundable except for students withdrawing, graduating, or not returning. Credit balances at the end of each semester will carry forward to the next semester or term. Students withdrawing during the semester must submit written requests for refunds in an amount greater than \$5. Requests will be accepted at the Tiger 1 Card Office not later than 30 days after the end of the semester or term for those students graduating or not returning. After this time any refunds will be forfeited. Any indebtedness to the University will be deducted from refunds issued.

FINANCIAL AID

The Office of Student Financial Aid administers and coordinates various types of undergraduate financial aid administered by Clemson University: scholarships, loans, grants, and part-time employment. The office works jointly with the Financial Aid and Placement Committee and the University Scholarships and Awards Committee.

Students may apply after January 1 for financial assistance for the next academic year. Financial aid requests, based on financial need, must be supported by a processed Free Application for Federal Student Aid (FAFSA) and renewed annually. No application is required for the LIFE Scholarship.

The FAFSA must be submitted by February 1 for need-based scholarship consideration and by April 1 for the federally funded Federal Supplemental Educational Opportunity Grant (FSEOG), Federal Work-Study, Federal Perkins Loan, and South Carolina State Need-Based Grant. April 1 is the suggested deadline for application for the Federal Pell Grant and Federal Stafford Loan.

Transfer students applying for student loans will be considered as entering freshmen in determining maximum loan limits. Following enrollment, after the credit evaluation process has been completed, students may submit an additional request loan application for additional funds due to changes in class standing.

A brochure detailing the financial aid programs at Clemson University can be obtained from Student Financial Aid, G-01 Sikes Hall, Box 345123, Clemson University, Clemson, SC 29634-5123.

Satisfactory Academic Progress for Financial Aid Eligibility

Students must maintain satisfactory academic progress to be eligible for financial aid. This policy contains both qualitative (grade-point ratio) and quantitative (credit hours completed) requirements. Students must meet the grade-point ratio requirement as stated under the Continuing Enrollment Policy. Students must also complete 12, 9, or 6 hours per semester according to their enrollment (full time, $\frac{3}{4}$ time, or $\frac{1}{2}$ time) as of the last day to add a course. Students have a maximum of 12 full-time semesters in which to finish their degree, or the equivalent in part-time enrollment. Duplicate credits taken at Clemson University do not count as credits completed for satisfactory academic progress. Details are available in the publication *Financing Your Clemson University Education*. Students wishing to appeal their academic progress status may submit a letter to Student Financial Aid. This appeals process is separate from the Appeals Committee on Continuing Enrollment. Students returning under the academic renewal policy who apply for financial aid should also submit a letter to Student Financial Aid to update their academic progress record.

Educational Benefits for Veterans, War Orphans, and Children of Deceased or Disabled Law**Enforcement Officers or Fire Fighters**

The Veterans Administration provides educational assistance for veterans and children of deceased or totally disabled veterans who meet requirements of applicable laws and regulations. Any veteran or child of a deceased or totally disabled veteran should communicate with the nearest Veterans Administration Office to determine whether or not he/she is entitled to any educational benefits. Free tuition is available to children of South Carolina law enforcement officers or fire fighters who were totally disabled or killed in the line of duty. Certification is required from the agency of the parent's employment. Upon presentation of proof of eligibility, a student shall not become eligible for educational assistance until the beginning of the academic term.

STUDENT SERVICES

HOUSING

Single Student Housing

University housing provides a "home away from home" for approximately 6,500 single students in 19 residence halls, three apartment complexes and the Clemson House. Most rooms are double occupancy with a limited number of single rooms available. The two-bedroom apartments each accommodate four students. All University housing is equipped to meet the needs of today's college student. Approximately four weeks after admissions application and fee are received, housing information will be mailed to students. A signed housing contract, room preference card, and a \$25 nonrefundable application fee should be returned to the Housing Office to reserve a space. Transfer students and former students returning are offered on-campus housing if space is available.

Graduate Student Housing

Apartment-style housing designed for the specific needs of graduate students is available on a 9- or 12-month lease. Apartments are double occupancy, allowing space for privacy in an area conducive to studying. Graduate and former students interested in on-campus housing should contact the Housing Office, Assignments, 200 Mell Hall, Box 344075, Clemson, SC 29634-4075. Refunds are made according to the Housing contract.

Family/Faculty Housing

Clemson provides comfortable and economical housing with 96 apartments, conveniently located on campus, for married and single-parent students. Students with graduate assistantships or fellowships are given priority for this housing. Brochures and application forms are available from the Family Housing Office, 101 Mell Hall, Clemson University, Box 344075, Clemson, SC 29634-4075.

REDFERN HEALTH CENTER

Medical Services

Redfern Health Center, an outpatient facility, operates Monday-Friday, 7:30 A.M.-5:00 P.M. (summer hours 8:00 A.M.-4:30 P.M.). Students without an appointment are seen in the Nurses Clinic. ASK-A-NURSE telephone services are also available. The student health center offers outpatient ambulatory care for illnesses and injury, pharmacy, lab, x-ray, and specialty clinics including orthopedics and women's health.

A completed medical history questionnaire is required of all students entering the University for the first time. Documentation of two red measles (rubeola) vaccines since the student's first birthday is required. Students born prior to January 1, 1957, are exempt from the measles requirements. A tuberculin skin test (PPD) is required within the past year. Students with a history of a positive skin test are required to have a chest x-ray within the past year. Students not in compliance with immunization requirements will not be allowed to complete registration.

Counseling and Psychological Services

CAPS provides comprehensive diagnostic assessment, individualized treatment, and aftercare for a variety of problems related to learning, personal and social development, depression, nutrition, alcohol, and other substance abuse related problems. Clinical and support groups are also available to address many of these concerns.

A Specialized Diagnostic Testing Program provides easy access for students to determine the extent of their learning disabilities and other problems, as well as to receive recommendations for solutions. Specialized Diagnostic Testing fees are charged to the client.

Crisis Management Team provides coverage 24 hours a day. After hours and on weekends, on-call counselors are available in case of emergency.

CAPS clinicians are credentialed professional counselors and psychologists with faculty appointments.

Health Education/ Alcohol and Drug Education

Health Education strives to create a wholesome environment offering opportunities for the campus community to develop positive health behaviors. Students are encouraged to achieve optimal health by sharing knowledge, enhancing skills, and accepting responsibilities. Health Education's goal is to help educate and train students to become leaders and role models on campus. Health Education facilitates an exchange of knowledge, encourages students to adopt healthy life styles, modifies negative and/or risky behavior patterns, and cultivates positive attitudes.

Health Education consists of the Peer Health Education Program, Campus Awareness Programming, Drug and Alcohol programs, and HIV/AIDS counseling.

Financial Considerations

Health Fee. University policy requires that all students registered for seven or more credit hours during the fall or spring semester or four or more credit hours during a summer session pay the University health fee. The health fee provides access to the professional services of University physicians, nurse practitioners, counselors, and health educators at no additional cost; reduced costs for medical diagnostics; and an after-hours urgent care insurance benefit. Students pay for pharmaceuticals, orthopedic equipment, specialty clinics, and psychological testing. Payment is expected at the time of service. Students may pay in cash, check, MasterCard, Visa, or Tiger Stripe.

Health Insurance. The University offers an accident and sickness insurance plan to help cover major medical expenses. Information is sent to all students prior to the fall semester. Students are strongly encouraged to have comprehensive health insurance coverage during their tenure at the University.

After Hours

Students may call ASK-A-NURSE Sunday-Thursday, 4:00-8:00 P.M. A registered nurse is available to answer questions, provide health information, and schedule appointments.

Students requiring the care of a physician after hours choose from area emergency rooms and urgent care facilities including Clemson Health Center, Oconee Memorial Hospital, Anderson Area Medical Center, Baptist Medical Center, and Greenville Memorial Medical Center. Medical costs incurred are the student's responsibility. Students should contact Redfern the next business day for follow-up care.

On-campus medical emergencies are transported by the University ambulance to the closest community medical resource. The University ambulance is staffed with licensed emergency medical personnel 24 hours a day. Students are required to pay for off-campus ambulance transportation except for those medical resources within the city of Clemson for after-hours urgent care.

CAREER SERVICES

Clemson's Career Center offers a range of services. The Career Center staff provides assistance in choosing a major, exploring careers, seeking internships, networking for part-time, summer, or permanent jobs; and applying to graduate and professional schools. Assistance is also available in writing résumés and preparing for interviews.

The Career Center features a large career library with information on the job outlook and salaries for hundreds of careers. A great deal of information on employers, internships, graduate/professional schools, and career planning, as well as listings of part-time jobs off campus, is available.

Career interest testing, computerized career assistance, and various tests required by graduate and professional schools are offered at the Career Center. In addition to providing on-campus interviewing, the Center also refers students' résumés to employers and offers a database of employers for students to access.

The Career Center sponsors several major events each year. These include a career expo with over 140 employers, an internship fair, a graduate and professional school day, and a job fair for prospective teachers.

DISABILITY SERVICES

Student Disability Services coordinates the provision of reasonable accommodations for students with physical, emotional, or learning disabilities. Accommodations are individualized, flexible, and confidential based on the nature of the disability and the academic environment in compliance with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990.

Students are encouraged to consult with Disability Services staff early in the semester, preferably prior to the first day of class. Current documentation of a specific disability from a licensed professional is needed. For additional information or an appointment, contact the Office of Orientation, Leadership, and Disability Services in 707 University Union (Voice/TTY 656-0515). For details on policies and procedures, visit our Web site at www.clemson.edu/Disability_Services.

ACADEMIC REGULATIONS

Proper discharge of all duties is required at Clemson University, and a student's first duty is his/her scholastic work. All students should be thoroughly acquainted with these basic requirements.

CREDIT SYSTEM

The semester hour is the basis of all credits. Generally, one recitation hour or three laboratory hours a week for a semester constitute a semester hour. Thus, in ENGL 101 Composition I, 3(3,0), as this subject is listed in the *Courses of Instruction* section of this catalog, the student takes three semester hours. When the course is completed satisfactorily, three credit hours are entered on the student's record. The notation "3(3,0)" means that the course carries three credits, has three clock hours of theory or recitation per week, and no laboratory hours. CH 101 General Chemistry, 4(3,3), carries four semester hours, has three hours of theory, and a three-hour laboratory period.

Credit Load

Except for an entering freshman who is restricted to the curriculum requirements of his/her major, the credit load for an undergraduate must be approved by the class advisor. The class advisor will approve a credit load deemed in the best interest of the student based on such factors as course requirements, grade-point ratio, participation in other activities, and expected date of graduation.

For fall and spring semesters, the maximum number of hours in which a student may enroll is 21, and 15 hours is the maximum credit load for those on probation. Permission of the department chair in which the student is a major is required for all registration involving more than 21 hours, or 15 hours for those on probation. Enrollment in summer is limited to 10 credit hours each term.

Full-time Enrollment

In fall and spring semesters, enrollment in 12 or more credit hours is considered full time. Combined enrollment in 12 or more hours in Maymester and first and second summer terms is considered full time for the summer. Enrollment in fewer than 12 credit hours is part time.

Advanced Placement and Credit by Examination

In addition to earning credit by the usual method involving classroom attendance, a student may receive credit toward his/her degree by completing a course successfully by examination only. Freshmen interested in exempting some elementary courses in this manner should participate in the College Board Advanced Placement Examination program and have the results of these tests sent to Clemson.

Certain departments will also grant credit for successful completion of College-Level Examination Program (CLEP) subject examinations which are administered by the College Board.

Enrolled students may earn credit by means of a special examination without the necessity of class attendance subject to the following requirements:

1. The applicant must present evidence that he/she has received training or taken work which is approximately equivalent to that given in the course at Clemson for which an examination is requested.
2. The applicant must not have previously failed or audited the course at Clemson.
3. The applicant must apply in writing for the examination, and the request must be approved by the instructor, chair of the department in which the course is taught, and the Office of Records and Registration. Application forms are available in the Office of Records and Registration.
4. Credit (CR) will be awarded for acceptable work in lieu of letter grades in recognition of college-level achievement as determined by College Board Advanced Placement Examination, College-Level Examination Program subject examination, institutional special examinations, and similar instruments.

Transfer Credit

For Clemson students, coursework completed with a grade of C or higher at other regionally accredited institutions, including correspondence courses, telecourses, and appropriate exemption credit, will be evaluated for transfer in terms of equivalent courses included in the Clemson curriculum of the student's choice. This does not guarantee that all courses taken at other institutions will be accepted for transfer. The acceptability of each course or exemption will be based on an evaluation by the faculty concerned. Coursework earned at different institutions will not be joined to equate with one Clemson course. No course taken at a nonbaccalaureate-degree granting institution may be used as an equivalent or substitute for any 300- or 400-level Clemson course.

Learning experiences including, but not limited to, military service schools, non-collegiate sponsored instruction, work related experiences, etc. will not be evaluated for transfer; however, enrolled students may request credit by examination for any non-transferable learning experience. For additional information, see section entitled *Advanced Placement and Credit by Examination* in this catalog.

Approval of each course should be obtained by the student prior to scheduling the class. By obtaining advance approval, the student is assured of receiving proper credit at Clemson upon satisfactory completion of the course. Information and forms relative to this approval may be obtained in the Student Records Office, 104 Sikes Hall.

GRADING SYSTEM

The grading system is as follows:

- A—*Excellent* Indicates work of a very high character, the highest grade given.
- B—*Good* Indicates work that is definitely above average, though not of the highest quality.
- C—*Fair* Indicates work of average or medium character.
- D—*Pass* Indicates work below average and unsatisfactory, the lowest passing grade.

F—*Failed* Indicates that the student knows so little of the subject that it must be repeated in order that credit may be received.

I—*Incomplete* Indicates that a relatively small part of the semester's work remains undone. Grade I is not given a student who made a grade F on his/her daily work. Students are allowed thirty days after the beginning of the next scheduled session, excluding summers and regardless of the student's enrollment status, to remove the incomplete grade. Normally, only one extension for each I may be granted, and this under unusual circumstances. The extension must be approved in writing by the instructor of the course and the chair of the department in which the course was taken. The extension will indicate the nature and amount of work to be completed and the time limit. (Students under this policy are prohibited from removing the I by repeating the course.) A letter grade of I converts to F unless the incomplete is removed within the time specified.

W—*Withdraw* Indicates that the student withdrew from the course or was withdrawn by the instructor after the first two weeks of classwork and prior to the last seven weeks of classes, not including the examination period. Proportionate time periods apply during summer and other shortened sessions. Each undergraduate student is allowed to withdraw or be withdrawn with a grade of W from no more than 17 hours of coursework during the entire academic career at Clemson University. Transfer students may withdraw from no more than 12 percent of the total work remaining to be done in the chosen undergraduate curriculum at the time of transfer to Clemson University up to a total of 17 hours of coursework, whichever is fewer. Partial credit for courses cannot be dropped. A student who exceeds these limits of hours or who is enrolled during any part of the last seven weeks of classes shall have final grades recorded. A student may withdraw from the University subject to the restrictions above. Additionally, pending approval from the provost or the provost's designee, students may withdraw from Clemson University one time only during their academic careers prior to the final seven weeks of classes (proportionate time periods apply during summer and other shortened sessions), without reduction from their allotted W hours. Any variance from these restrictions must be approved by the provost or the provost's designee and must be requested within 90 calendar days (exclusive of summer vacation) from the date printed on the grade report. The student must document the circumstances supporting the request. For financial aid purposes, enrollment is defined and satisfactory academic progress levels are established as of the last day to register or add classes. Withdrawal can negatively impact financial aid eligibility if a student does not complete a sufficient number of hours. Details are available in the publication *Financing Your Clemson University Education*.

Grade-Point Ratio

In calculating a student's grade-point ratio, the total number of grade points accumulated by the student is divided by the total number of credit hours attempted at Clemson during the semester, session, or other period for which the grade-point ratio is calculated. For each credit hour, the student receives

grade points as follows: A-4, B-3, C-2, D-1. No grade points are assigned for grades F, I, P, or W.

Pass/Fail Option

Juniors or Seniors enrolled in a four-year curriculum may take four courses (maximum of 15 credit hours), with not more than two courses in a given semester on a Pass/Fail basis. Transfer and five-year program students may take Pass/Fail courses on a pro rata basis. Only courses to be used as electives may be taken optionally as Pass/Fail.

Letter-graded courses which have been failed may not be repeated Pass/Fail.

Registration in Pass/Fail courses will be handled in the same manner as for regular enrollment. Departmental approval must be obtained via approval form and returned to the Office of Records and Registration in accordance with the University calendar for adding courses. Instructors will submit letter grades to the Office of Records and Registration. These grades will be converted as follows: A, B, C to P (pass); D, F to F (fail). Only P (minimum letter grade of C) or F will be shown on a student's permanent record and will not affect the grade-point ratio.

If a student changes to a major which requires a previously passed course, and this course has been taken Pass/Fail, he/she may request either to take the course on a letter-graded basis, the P be changed to C, or substitution of another course.

In the event limited enrollment in a class is necessary, priority will be given as follows: majors, letter-graded students, Pass/Fail students, and auditors.

Mid-term Grades

Once, near mid-term, in every undergraduate course the instructor shall make available for each student (a) that student's ranking to-date in that course or (b) that student's course grade to-date, relative to the grading system stated in the course syllabus.

This feedback should occur near mid-term, but it shall occur no later than the course meeting prior to the last day to withdraw without final grades. More frequent feedback is strongly encouraged.

Both student and instructor are to recognize that this feedback reflects the student's performance up to that point in time, and as such, that student's final course grade may change based upon subsequent coursework performance(s).

The policy includes all undergraduate courses and applies to all summer sessions, including Maymester.

Final Examinations

The standing of a student in his/her work at the end of a semester is based upon daily classwork, tests or other work, and the final examinations. Faculty members may excuse from the final examinations all students having the grade of A on the coursework prior to the final examination, but for all other students written examinations are required in all subjects at the end of each semester, except in certain laboratory or practical courses in which final examinations are not deemed necessary by the department faculty.

Final examinations must be given on the dates and at the times designated in the final examination schedule.

Grade Reports

Final grade reports are mailed to enrolled students at the end of each semester, or summer session if appropriate, at their home addresses.

Dropping Classwork

A subject dropped after the first two weeks of classwork and prior to the last seven weeks during the fall and spring semesters is recorded as W—Withdraw. Proportionate time periods apply during summer sessions.

Continuing Enrollment Policy

At the end of any enrollment period, a notice of academic probation shall be placed on the grade report of an undergraduate student if his/her cumulative grade-point ratio is below 2.0, which is the minimum necessary for graduation.

In the event that a student is placed on academic probation, notification to that effect will be placed on the grade report for that session in which the student's academic deficiency occurred and for each session the student remains on probation. The student who clears probation by returning to the graduating academic requirement (2.0) will have notice to that effect placed on the grade report for that session. No notation concerning probation is placed on the student's permanent record.

A student on academic probation will be suspended or dismissed at the end of the spring semester if his/her cumulative grade-point ratio is below the minimum cumulative grade-point ratio (MCGPR). Students entering Clemson University for the first time will not be subject to suspension until the student has attempted coursework at Clemson for two semesters, that is, fall and spring semesters (not necessarily consecutive enrollment). The minimum cumulative grade-point ratio is 2.0 for students with

credit levels greater than or equal to 95 hours. For students with credit levels less than 95 hours, the MCGPR is given in the table below. CL in the table is the student's credit level, based on all credits taken at Clemson, plus any advanced standing received from transfer credits and credits based on approved examination programs.

A student who passes at least 12 semester credit hours and earns a 2.2 semester grade-point ratio on all hours attempted in the most recent semester (fall or spring) or summer session(s) is permitted to continue enrollment even though his/her cumulative grade-point ratio is below the required minimum grade-point ratio, defined above.

A student's first failure to qualify for continued enrollment will subject him/her to suspension from the University for the next fall or spring semester. Notice of academic suspension will appear on the permanent record.

Upon enrolling after suspension, a subsequent failure to meet the requirements for continued enrollment before clearing probation will result in dismissal from the University, and notice of dismissal will appear on the permanent record. Dismissals are for one calendar year.

Students subject to suspension or dismissal may appeal to the Appeals Committee on Continuing Enrollment at the end of the spring semester or summer session(s). The Appeals Committee on Continuing Enrollment meets approximately one week after final exams following spring and second summer session. Appeals must be in the Office of Undergraduate Academic Services no later than three days prior to the Appeals Committee meeting. An appeal must include a letter from the student giving a complete explanation for the student's poor academic performance. To the extent possible, verifiable documentation should also be included. Students are strongly encouraged to submit a letter directly to the chairperson of the Appeals Committee on Continuing Enrollment from the pertinent

CL	MCGPR	CL	MCGPR	CL	MCGPR	CL	MCGPR
16	1.28	36	1.68	56	1.85	76	1.94
17	1.31	37	1.69	57	1.85	77	1.94
18	1.35	38	1.70	58	1.86	78	1.94
19	1.37	39	1.72	59	1.86	79	1.95
20	1.40	40	1.73	60	1.87	80	1.95
21	1.43	41	1.74	61	1.88	81	1.95
22	1.45	42	1.75	62	1.88	82	1.96
23	1.47	43	1.75	63	1.89	83	1.96
24	1.50	44	1.76	64	1.89	84	1.96
25	1.52	45	1.77	65	1.89	85	1.97
26	1.53	46	1.78	66	1.90	86	1.97
27	1.55	47	1.79	67	1.90	87	1.97
28	1.57	48	1.79	68	1.91	88	1.97
29	1.59	49	1.80	69	1.91	89	1.98
30	1.60	50	1.81	70	1.92	90	1.98
31	1.62	51	1.82	71	1.92	91	1.98
32	1.63	52	1.82	72	1.92	92	1.99
33	1.64	53	1.83	73	1.93	93	1.99
34	1.66	54	1.84	74	1.93	94	1.99
35	1.67	55	1.84	75	1.93	95	2.00
						95+	2.00

The values in this table are based on the following formula: $MCGPR = 2.25 \times (CL / (CL + 12))$

department chair (or designate) or academic advisor stating support of the student for continued enrollment in that department. Appeals will be granted only in the most exceptional cases, and a student will be allowed to continue on appeal only once prior to dismissal. Students who return on a successful appeal must meet the conditions specified by the Appeals Committee on Continuing Enrollment.

Students subject to suspension or dismissal after the spring semester will be permitted to enroll in summer school and may have their regular enrollment reinstated immediately if the summer school work brings their cumulative grade-point ratio above the minimum cumulative grade-point ratio or if the student passes at least twelve semester credit hours and earns a 2.2 grade-point ratio on all hours attempted during the summer session(s).

When a student is suspended or dismissed for academic reasons, ineligibility to continue officially commences on the first day of classes of the very next semester (fall or spring, as appropriate) immediately following the decision of ineligibility.

A student who has been dismissed may file a petition for readmission with the Appeals Committee on Continuing Enrollment after one calendar year. If this petition is denied, the student may file subsequent petitions for readmission after any intervening term of enrollment. Dismissed students who are readmitted and again fail to meet the requirements for continuing enrollment will be dismissed and may not appeal to continue.

This continuing enrollment appeals process is separate from the unsatisfactory academic progress appeal with Student Financial Aid. Students subject to suspension or dismissal must be allowed to continue enrollment before submitting a satisfactory academic progress appeal for financial aid eligibility. Further information on satisfactory academic progress is available in the *Financial Information* section and in the publication *Financing Your Clemson University Education*.

Grade Protests

A student wishing to protest a final course grade must first try to resolve any disagreement with the instructor. If unable to reach a resolution, the student may follow the procedures listed under "Academic Grievance Committee." Grievances must be filed within 90 calendar days (exclusive of summer vacation) from the date printed on the grade report.

Repeating Courses Passed

A student may repeat a course passed with a grade lower than B. Both grades will be calculated in the grade-point ratio; however, credit for the course will be counted only once toward the number of hours required for graduation. For financial aid purposes, duplicate credits do not count as credits completed for satisfactory academic progress. If a student repeats a course passed with a grade of B or better, the credits attempted as well as credits and grade points earned will be removed from the cumulative summary.

Repeating Courses Failed

A student who has failed a course (made F) cannot receive credit for that course until it has been satisfactorily repeated hour for hour in a class; except that in the case of correlated laboratory work, the number of hours to be taken shall be determined by the instructor. Where separate grades for class and laboratory work are given, that part of the subject shall be repeated in which the failure occurs. Successfully repeating a course previously graded F does not erase the original F grade from the student's record. Both grades will appear on the record and will be computed in the grade-point ratio.

GRADUATION REQUIREMENTS

A candidate for an undergraduate degree is a student who has turned in a completed diploma application by the deadline prescribed in the University calendar for a particular graduation date.

Residence Requirement

To qualify for an undergraduate degree, a student must complete from Clemson a minimum of 30 of the last 36 credits presented for the degree.

Make-up of Incompletes Received in Last Semester

A candidate for a degree who in the semester immediately prior to graduation receives one or more grades of I shall have an opportunity of removing the unsatisfactory grades provided the final grades are received in the Office of Records and Registration, 104 Sikes Hall, by the time grades for candidates for graduation are due. A candidate who qualifies for graduation under this regulation will be awarded his/her degree on the regular date for the award of degrees.

Special Requirements

A cumulative grade-point ratio of 2.0 is required for graduation. Candidates for degrees are required to apply for their diplomas within three weeks following the opening of the final semester or the opening of the first summer session prior to the date the degrees are to be awarded. Applications should be filled out in the Office of Records and Registration, 104 Sikes Hall, on the forms provided.

Credit Limitation

If all work toward a degree is not completed within six years after entrance, the student may be required to take additional courses.

Academic Honors

Honor Graduates

To be graduated with honors a student must have a minimum cumulative grade-point ratio as follows: cum laude—3.4, magna cum laude—3.7, and summa cum laude—3.9.

Honor Lists

At the end of the fall and spring semesters, the following lists shall be compiled of undergraduate students who have achieved grade-point ratios of 3.5 to 4.0 on a minimum of 12 semester hours, exclusive of Pass/Fail coursework.

- Dean's List—3.5 to 3.99 grade-point ratio
- President's List—4.0 grade-point ratio

Honors and Awards

The University offers a number of awards for outstanding achievement in specific fields and endeavors. Recipients are chosen by selection committees and are announced at the annual Honors and Awards Day program or other appropriate ceremonies. Detailed information relating to such awards is available in the offices of the academic deans and department chairs.

CLASSWORK

Course Prerequisites

Prerequisites for each course are enumerated under each course in the *Courses of Instruction*. In addition to these requirements, colleges and departments may also establish other standards as conditions for enrollment. It is the student's responsibility to refer to individual college and curricular information for specific standards.

Class Attendance

College work proceeds at such a pace that regular attendance is necessary for each student to obtain maximum benefits from instruction. Regular and punctual attendance at all class and laboratory sessions is a student obligation, and each student is responsible for all the work, including tests and written work, in all class and laboratory sessions. No right or privilege exists that permits a student to be absent from any given number of class or laboratory sessions except as stated in the syllabus for each course. At the same time, it is obvious that students have valid reasons for missing classes; the instructors are expected to be reasonable in the demands they place on students. In this regard, instructors must inform the students in the syllabus required in every class what constitutes excessive absences and the penalty, if any, for such absences. Faculty who impose penalties for excessive absences must keep accurate attendance records.

Some students are on scholarships and/or grants-in-aid overseen by the University Scholarships and Awards Committee. The acceptance of such scholarships and/or grants-in-aid may require participation in events both on and off campus. Additionally, students occasionally are required to miss class because of participation in co-curricular activities, such as class trips, that the faculty members note on their syllabi. The student must discuss these activities with the faculty members whose classes will be missed well in advance of their occurrences. The documentable absences are necessary, and the instructor will make arrangements for those students to make up graded work that takes place during those necessary absences. The time, location, and nature of the make-up work will be at the discretion of the instructor. If required, documentation will be provided to instructors by students.

Instructors are expected to set reasonable policies in working with those student personal documentable absences that are truly beyond the student's control. After reviewing the reason for the absence, the instructor at his/her discretion may allow the student to make up the graded work missed.

All other aspects of class attendance are within the discretion of the instructor, department, or college responsible for the course. If a student feels unfairly

treated in any attendance-related situation, the student has the right of appeal to the Academic Grievance Committee.

First Day Class Attendance

All students are required to attend the first scheduled day of classes and labs. Students who cannot attend the first class are responsible for contacting the instructor to indicate their intent to remain in that class. If a student does not attend the first class meeting or make contact with the instructor by the second meeting or the last day to add, whichever comes first, the instructor has the option of dropping that student from the roll.

Dead Days

During Dead Days, all regularly scheduled classes are conducted; however, course testing on these days is limited to scheduled laboratory and one semester hour course final exams and make-up tests. Dead Days are observed during fall and spring semesters only.

Note: Dead Days do not apply to courses numbered 600 or above.

Auditing Policies

Qualified students may audit courses upon the written approval of the instructor. Auditors are under no obligation of regular attendance, preparation, recitation, or examination and receive no credit. Participation in classroom discussion and laboratory exercises by auditors is at the discretion of the instructor. A student who has previously audited a course is ineligible for credit by examination.

Undergraduate and graduate students enrolled in 12 or more hours may audit courses at no additional charge. Others interested in auditing should verify their eligibility through the Registrar's Office.

Cross-Listed Courses

A cross-listed course is one that can be taken for credit under different departmental titles. For example, students can take Demography as either R S 471 or SOC 471. The student should select the desired departmental title in conference with an advisor. The departmental title may be changed only during the period allowed by the University calendar for adding a course.

Enrollment in Graduate Courses

Enrollment of Clemson University seniors in any graduate course is subject to approval by the department offering the course and the Graduate School. This approval is required prior to registration and may be obtained by completing and returning to the Graduate School Office the appropriate form (Form GS6, available at the Graduate School Office). The total course work load for the semester must not exceed 18 hours, and the cumulative graduate credits earned by seniors shall not exceed 12 semester hours.

Seniors with a cumulative grade point ratio of 3.0 or higher may enroll in 700- or 800-level courses and may use these courses to meet requirements for the bachelor's degree. However, courses used for this purpose cannot be counted later toward an advanced degree. Alternatively, such students may take 600-, 700- or 800-level courses in excess of

the requirements for their undergraduate degrees and may request that these courses be included as a part of their graduate program if they are subsequently admitted to the Graduate School. Courses cannot be taken at the 600 level if their 300- and 400-level counterparts are required for the undergraduate degree in the same academic major as the proposed graduate degree.

A Clemson senior with a cumulative grade-point ratio less than 3.0 may apply to the Graduate School for conditional acceptance. If accepted, the student may enroll in graduate courses for inclusion in a future graduate program, subject to approval of Form GS6. The form must be turned in and accepted by the Graduate School before a student can register for graduate courses.

In all cases, the credits and quality points associated with senior enrollment in graduate courses will be part of the undergraduate record.

ACADEMIC RECORDS

The student's permanent academic record is maintained in the Registrar's Office and contains permanent identifying information, grades, and credits. Where appropriate, statements of a corrective nature, withdrawals, suspension for failure to meet academic standards, suspension for disciplinary reasons, and graduation data are added. It is a historical record of the student's academic progress.

Classification

All new students are classified as freshmen unless they have attended another college prior to entrance. Students who have completed college work elsewhere will be classified on the basis of semester hours accepted at Clemson rather than the amount of work presented. To be classified as a member of any class other than freshman, students must meet the credit-hour requirements below:

- Sophomore—30 credit hours
- Junior—60 credit hours
- Senior—95 credit hours

Academic Advising

Each student is assigned to an academic advisor in his/her major area. It is the responsibility of the student to consult with the advisor during registration. The advisor will assist the student in scheduling courses so as to fulfill the requirements of the degree program. Nevertheless, it is the responsibility of the student to fulfill the relevant requirements of the degree. Advisors also maintain files on individual advisees to assist in academic planning.

Change of Major

Any undergraduate student who meets the Continuing Enrollment Policy after attempting 12 credit hours at Clemson University (or who is allowed to continue by virtue of a semester 2.2 grade-point ratio on 12 earned credits or who is allowed to continue through appeal to the Continuing Enrollment Appeals Committee or by other authorization of this committee) may transfer from one major to another at will. Any college or department which seeks an exception to this policy must have the approval of the collegiate dean and the Provost.

Withdrawal from the University

A student may withdraw from the University subject to the restrictions in the section on W—Withdraw. Students who exceed these restrictions shall have final grades recorded. Any variance from the restrictions must be approved by the provost or the provost's designee and must be requested within 90 calendar days (exclusive of summer vacation) from the date printed on the grade report. The student must document the circumstances supporting the request. All University withdrawals (including withdrawing from the only course in which a student is enrolled) must be processed by the Director of Undergraduate Academic Services. Students should report to Room 101, Sikes Hall. For financial aid purposes, enrollment is defined and satisfactory academic progress levels are established as of the last day to register or add classes. Withdrawing from the University can negatively impact financial aid eligibility if a student has not completed a sufficient number of hours. Details are available in the publication *Financing Your Clemson University Education*.

Academic Renewal

The student who has not enrolled at Clemson for a period of two or more academic years may apply to the Appeals Committee on Continuing Enrollment for readmission under special conditions known as academic renewal. Under these conditions, the previous credits attempted and quality-point deficit will not constitute a liability in a new grade-point computation. However, no credits passed or their attending quality points will be available to the student for a degree at Clemson. The previous record will appear on the permanent record as well as the notation of readmission under the policy of academic renewal. Students returning under the academic renewal policy who apply for financial aid should submit written notification of their status to the Office of Student Financial Aid in order to update their academic progress record.

ACADEMIC GRIEVANCE COMMITTEE

I. General

The Academic Grievance Committee hears all grievances involving the following: (a) allegations of undergraduate student academic dishonesty; (b) allegations by undergraduate students against a faculty or staff member of discrimination in academics on the basis of race, color, national origin, sex, age, religion, disability, or veterans status (except in those cases where the grievance involves student employment); (c) grievances of a personal or professional nature involving an individual undergraduate student and a faculty member; and (d) claims by undergraduate students concerning the inequity of final grades. (The only aspects of a final grade case that are grievable are claims by students of final grades being changed because of personal or professional reasons. Students may not grieve issues such as quality of instruction or the difficulty of testing, for example.) In all unresolved cases, the committee makes its recommendations to the President through the Provost. All proceedings of the committee are confidential. (For possible grievances arising from the inability to under-

stand teachers whose first language is not English, the student must follow the English Fluency Policy referenced in the *Student Handbook* and *Schedule of Classes*.)

The Academic Grievance Committee is composed of 28 members as follows:

A. Fifteen members of the faculty; three members from each college. Members are appointed on a staggered basis by the respective college deans and serve for a period of three years. Term commences with fall semester registration.

B. Twelve undergraduate students, nominated by the student body president, approved by the Student Senate and appointed by the Provost for one-year terms. Nominations should be made in the spring semester. Term of service commences with fall semester registration. At least one and no more than three students shall be appointed from any one college.

C. Dean of Student Life (or designee);

D. The Senior Vice Provost and Dean of Undergraduate Studies shall appoint the chairperson from those faculty members who have previously served.

II. Academic Dishonesty

A. General

1. Academic dishonesty includes giving, receiving or using unauthorized aid on any academic work.

2. Plagiarism, a form of academic dishonesty, includes the copying of language, structure or ideas of another and attributing the work to one's own efforts.

3. All academic work submitted for grading contains an implicit pledge and may contain, at the request of the instructor, an explicit pledge by the student that no unauthorized aid has been received.

4. Academic dishonesty includes attempts to copy, edit or delete computer files that belong to another person or use of Computer Center account numbers that belong to another person without the permission of the file owner, account owner or file number owner.

B. Penalties

1. Penalties for a first offense are at the discretion of the instructor but shall not exceed receiving a grade of F for the course.

2. A student guilty of the second offense of academic dishonesty will receive a grade of F for the course, will be suspended for one or more semesters and may be permanently dismissed. Suspension or dismissal requires approval of the President of the University.

C. Procedures

1. Academic honesty is the individual responsibility of each student. Students should report violations of this policy either to the faculty member of the affected course or to a department chair or dean in the course area or to the student's academic advisor.

2. When, in the opinion of a faculty member, there is evidence that a student has committed an act of academic dishonesty, the faculty member may contact the Ombudsman in the Office of Undergraduate Academic Services to discuss the evidence and see if the seriousness warrants a formal charge of academic dishonesty.

3. If the faculty member decides to file a formal charge, the following procedure must be followed:

a) The faculty member will inform each involved student in private of the nature of the alleged charge of academic dishonesty and will subsequently request in writing that the department chair verify from the registrar the incident's being a first offense.

b) When this information has been received, the faculty member will notify the student in writing of the charge of academic dishonesty and the penalty recommended by the faculty member with copies to the chair of the department in which the course is taught and to the registrar. (Note: Faculty should consider presenting the written notification to the student personally or by receipted certified mail.) The notification will further state that if the student regards the charge as unfair, the student has 14 calendar days from the date of receipt of notice to file a grievance with the Academic Grievance Committee (see below).

c) If no grievance is filed by the student, the faculty member will forward copies of the written notification to the dean of the college.

d) A charge of academic dishonesty in a course must be made within 45 calendar days of the date printed on the grade report for the semester or session in which the course is completed. A grade of I (Incomplete) is considered to be final when it is removed.

III. Rules and Procedures for

Academic Dishonesty Grievances

1. The only two aspects of an academic dishonesty case that are grievable are (a) whether the student is guilty of academic dishonesty; or (b) if proper procedures are followed. Note: Other aspects of the case may be grievable under Section IV.

2. Any student filing a grievance must first attempt to resolve it by consulting with the involved faculty member for resolution. In the event no resolution is reached, the student shall consult serially with the Ombudsman in the Office of Undergraduate Academic Services, the department chair and dean of the faculty member, who shall hear the grievance and act as mediators. The Ombudsman, dean, department chair, faculty member and student shall make every effort to reach a solution.

3. If the grievance remains unresolved, the student may bring a written statement detailing the grievance before the Academic Grievance Committee. The student must report to the Office of Undergraduate Academic Services and secure a checklist form which the student will use to document the following: (a) the dates of those consultations described in Procedure 2, above, (b) the names of those persons consulted, and (c) the signature of the collegiate dean attesting that no resolution could be reached. (Note: If all parties agree, the checklist may be signed and dated during the initial consultation.) Both the written statement and the checklist form must be delivered to the Office of Undergraduate Academic Services within 14 calendar days from the date of receipt of a written charge made by the faculty member. The grievance is considered filed when the written statement and the checklist are returned to the Office of Undergraduate Academic Services. The Office of Undergraduate Academic Services will retain the original documents, forward a copy of the grievance to the chairperson of the Academic Grievance Committee, and will also forward proper notification of

the filed grievance to the Office of Records and Registration. The failure of a student to file a grievance within the 14 calendar day period will cause him/her to forfeit his/her right to file a grievance under this procedure. (d) If a student files a grievance, the professor has 90 days (excluding summer) to respond.

4. The documents referred to in Procedure 3, shall be delivered to the chairperson of the Academic Grievance Committee. The chairperson shall, upon receipt of the documents, appoint a subcommittee consisting of a chairperson who is a faculty or staff member of the committee and at least two other committee members, including at least one student, to investigate the grievance. If possible, the subcommittee shall include members who are not in the same college as the grievant.

5. The committee members appointed by the chairperson will constitute the subcommittee to investigate the grievance. A minimum of three subcommittee members, including at least one student member, must be present for the subcommittee to conduct the hearing described in Procedure 8.

6. The subcommittee to investigate the grievance will attempt to gather all information pertinent to the grievance in separate meetings with the individuals who give information concerning the grievance; however, after the separate meetings have been held, the subcommittee may question the student and faculty member simultaneously in one meeting. Such a joint meeting will be held only if the subcommittee deems it necessary for clarifying the facts.

7. The Academic Grievance Committee will, to the greatest extent possible, handle each case in a confidential manner.

8. The hearing on the grievance will be informal and shall be closed to the public. The chairperson shall take whatever action is necessary to ensure an equitable, orderly and expeditious hearing. Minutes of the meeting shall be taken, and all parties to the grievances shall be given an opportunity to be heard. Each party is responsible for having present at the hearing all witnesses that he/she wishes to speak on his/her behalf. In addition, the chairperson may request the presence of any other person who can supply information pertinent to the grievance. Witnesses shall not be present during the hearing proceedings except when they are called to speak before the committee. The parties shall be permitted to question all individuals who are heard by the committee. If any witness is unable to be present at the hearing, the chairperson may, at his/her discretion, accept a written statement from that witness to be presented at the hearing. The parties shall be accorded the right to assistance of counsel of their own choice; however, counsel shall not be permitted to participate actively in the proceedings.

9. Upon conclusion of the hearing, the subcommittee shall reach, by majority vote, a posed solution to the grievance. The subcommittee chairperson shall then formulate the findings in writing and seek to obtain from the parties involved in the grievance signed acceptance for a recommended solution to the grievance. If all parties to the grievance accept the solution posed by the subcommittee, the matter of the grievance will be considered closed when the solution has been implemented. Copies of the written findings and recommended solution will be forwarded by the subcommittee chairperson

son to all parties to the grievance for acceptance in person or via return receipted certified mail. Each party will be asked to indicate acceptance of the posed solution by signing and returning the letter within 14 calendar days of its date. Failure to respond within 14 calendar days will constitute acceptance. Proper notification of the solution arrived at by the Academic Grievance Committee will then be mailed by the subcommittee chairperson to the Office of Records and Registration, faculty member, department chair of the student's major department, department chair and dean of the department and college where the course is taught, and the Director of Undergraduate Academic Services.

10. If, after the conclusion of the hearing on the grievance, the chairperson cannot secure acceptance of the posed solution, the grievance shall be referred to the President of the University via the Provost with the committee's recommended solution to the grievance along with all supporting evidence previously submitted to the Academic Grievance Committee. Should the grievance be forwarded to the President, both parties to the grievance shall be informed of this. When grievances are referred in this manner, the President, on behalf of the University, shall make the final decision on the solution to the grievance and will then notify the Office of Records and Registration, faculty member, department chair of the student's major department, department chair and dean of the department and college where the course is taught, and Director of Undergraduate Academic Services of the University's final decision.

11. The chairperson shall keep in confidence all records pertinent to each grievance and pass these records to the Office of the Provost for filing. Records shall be available to succeeding chairpersons of the Academic Grievance Committee.

12. The Academic Grievance Committee shall make every reasonable effort to resolve every grievance presented to it by the end of the semester in which each grievance is received.

13. These procedures can be changed by the Academic Council. Such changes shall not affect any case under consideration at the time of the change. Notification of any changes to the procedures shall be given to the President of the University via the Academic Council.

IV. Rules and Procedures for Grievances Other Than Academic Dishonesty Grievances

1. Any student filing a grievance must first attempt to resolve it by consulting with the involved faculty or staff member for resolution. In the event no resolution is reached, the student shall consult serially with the Ombudsman in the Office of Undergraduate Academic Services, the department chair and dean of the faculty member, who shall hear the grievance and act as mediators. The Ombudsman, dean, department chair or immediate staff superior, faculty or staff member and student shall make every effort to reach a solution.

2. If the grievance remains unresolved, the student may bring a written statement detailing the grievance before the Academic Grievance Committee. The student must report to the Office of Undergraduate Academic Services and secure a checklist form which the student will use to document the following: (a) the dates of those consul-

tations described in Procedure 1, above, (b) the names of those persons consulted, and (c) the signature of the collegiate dean attesting that no resolution could be reached. (Note: If all parties agree, the checklist may be signed and dated during the initial consultation.) Both the written statement and the checklist form must be delivered to the Office of Undergraduate Academic Services within 90 calendar days (exclusive of summer vacation) from the date the student alleges to have been aggrieved; or, in a case involving a protest of a final grade, the grievances must be filed within 90 calendar days (exclusive of summer vacation) from the date printed on the grade report for the term in which the student alleges that an inequitable grade was recorded. The Office of Undergraduate Academic Services will retain the original documents and forward a copy of the grievance to the chairperson of the Academic Grievance Committee. In a case involving a protest of final grade, the Office of Undergraduate Academic Services will notify the Office of Records and Registration of the filed grievance. The failure of a student to file a grievance within the 90-day period will cause him/her to forfeit his/her right to file a grievance under this procedure. (d) If a student files a grievance, the professor has 90 days (excluding summer) to respond.

3. The documents referred to in Procedure 2, shall be delivered to the chairperson of the Academic Grievance Committee. The chairperson shall, upon receipt of the documents, appoint a subcommittee consisting of a chairperson who is a faculty or staff member of the committee and at least two other committee members, including at least one student, to investigate the grievance. If possible, the subcommittee shall include members who are not in the same college as the grievant.

4. The committee members appointed by the chairperson will constitute the subcommittee to investigate the grievance. A minimum of three subcommittee members, including at least one student member, must be present for the subcommittee to conduct the hearing described in Procedure 7.

5. The subcommittee to investigate the grievance will attempt to gather all information pertinent to the grievance in separate meetings with the individuals who give information concerning the grievance; however, after the separate meetings have been held, the subcommittee may question the student and faculty or staff member simultaneously in one meeting. Such a joint meeting will be held only if the subcommittee deems it necessary for clarifying the facts.

6. The Academic Grievance Committee will, to the greatest extent possible, handle each case in a confidential manner.

7. The hearing on the grievance will be informal and shall be closed to the public. The chairperson shall take whatever action is necessary to ensure an equitable, orderly and expeditious hearing. Minutes of the meeting shall be taken, and all parties to the grievance shall be given an opportunity to be heard. Each party is responsible for having present at the hearing all witnesses that he/she wishes to speak on his/her behalf. In addition, the chairperson may request the presence of any other person who can supply information pertinent to the grievance. Witnesses shall not be present during the hearing proceedings except when they are called to speak before the committee. The parties shall be permitted to question

all individuals who are heard by the committee. If any witness is unable to be present at the hearing, the chairperson may, at his/her discretion, accept a written statement from that witness to be presented at the hearing. The parties shall be accorded the right to assistance of counsel of their own choice; however, counsel shall not be permitted to participate actively in the proceedings.

8. Upon conclusion of the hearing, the subcommittee shall reach, by majority vote, a posed solution to the grievance. The subcommittee chairperson shall then formulate the findings in writing and seek to obtain from the parties involved in the grievance signed acceptance for a recommended solution to the grievance. If all parties to the grievance accept the solution posed by the subcommittee, the matter of the grievance will be considered closed when the solution has been implemented. Copies of the written findings and recommended solution will be forwarded by the subcommittee chairperson to all parties to the grievance for acceptance via return receipted certified mail. Each party will be asked to indicate acceptance of the posed solution by signing and returning the letter within 14 calendar days of its date. Failure to respond within 14 calendar days will constitute acceptance. Proper notification of the solution arrived at by the Academic Grievance Committee will then be mailed by the subcommittee chairperson to the involved faculty or staff member, department chair of the faculty member or immediate superior of staff member, the involved collegiate dean, and Director of Undergraduate Academic Services. In a case involving a protest of a final grade, the subcommittee chairperson will also notify the Office of Records and Registration of the solution arrived at by the Academic Grievance Committee.

9. If, after the conclusion of the hearing on the grievance, the chairperson cannot secure acceptance of the posed solution, the grievance shall be referred to the President of the University via the Provost with the committee's recommended solution to the grievance along with all supporting evidence previously submitted to the Academic Grievance Committee. When grievances are referred in this manner, the President, on behalf of the University, shall make the final decision on the solution to the grievance and will then notify the involved faculty or staff member, department chair of the involved faculty member or immediate superior of the staff member, involved collegiate dean, and Director of Undergraduate Academic Services of the University's final decision. In a case involving a protest of a final grade, the President will also notify the Office of Records and Registration of the University's final decision.

10. The chairperson shall keep in confidence all records pertinent to each grievance and pass these records to the Office of the Provost for filing. Records shall be available to succeeding chairpersons of the Academic Grievance Committee.

11. The Academic Grievance Committee shall make every reasonable effort to resolve every grievance presented to it by the end of the semester in which each grievance is received.

12. These procedures can be changed by the Academic Council. Such changes shall not affect any case under consideration at the time of the change. Notification of any changes to the procedure shall be given to the President of the University via the Academic Council.

GENERAL EDUCATION

An undergraduate student whose enrollment in a curriculum occurs after May 15, 1996, must fulfill the general education requirements in the catalog in effect at the time. A student who withdraws from the University and subsequently returns after May 15, 1996, will be required to satisfy the general education requirements. Any variation in curricular or general education requirements shall be considered under the substitution procedure.

MISSION STATEMENT

Academic institutions exist for the transmission of knowledge, the pursuit of truth, the intellectual and ethical development of students, and the general well-being of society. Undergraduate students must be broadly educated and technically skilled to be informed and productive citizens. As citizens, they need to be able to think critically about significant issues. Students also need to be prepared to complete undergraduate work and a major course of study. The mission requires a high level of knowledge about and competence in the following areas: communication, computer use, mathematics, problem solving, natural sciences, social sciences, humanities, and arts. Thus the mission of general education is to provide Clemson undergraduate students with a structured base through which these needs can be met.

COURSE REQUIREMENTS

The general education requirements in some curricula are more restrictive than the general requirements shown below.

Courses approved for Oral Communication, Writing Intensive or Computer Skills credit are indicated in the *Courses of Instruction* in brackets (e.g. ENGL 314 3(3,0) [W.3]).

A. Communication and Speaking

Skills..... 12 hours

1. ENGL 101 and ENGL 102 6 hours

2. Oral Communication 3 hours

C E 350	O.1
C E 351	O.1
C E 459	O.1
CH E 307	O.1
CH E 407	O.1
CH E 432	O.1
CH E 444	O.1
E C E 320	O.1
E C E 495	O.1
E C E 496	O.1
ENT 305	O.2
ENT 462	O.1
M E 401	O.1
M E 402	O.2
SPCH 150	O.3
SPCH 250	O.3
SPCH 251	O.3

3. Writing Intensive 3 hours

B E 322	W.1
B E 471	W.1
CR P 483	W.2
CH E 307	W.1
CH E 407	W.1
CH E 432	W.1
E C E 311	W.1
E C E 312	W.1
E C E 371	W.1
E C E 417	W.1
ED 459	W.1
ED 488	W.1
ED F 458	W.1
ED SP 495	W.3
ENGL 304	W.3
ENGL 312	W.3
ENGL 314	W.3
ENGL 316	W.3
ENGL 333	W.3
ENGL 334	W.3
ENGL 345	W.3
ENGL 346	W.3
ENGL 386	W.1
HIST 365	W.2
M E 401	W.2
M E 402	W.1
MTHSC 302	W.1
NURS 320	W.1
NURS 330	W.1
NURS 405	W.1
NURS 406	W.1

B. Computer Skills 3 hours

AGRIC 200	C.3
B E 450	C.1
C E 251	C.1
C M E 304	C.1
CP SC 101	C.3
CP SC 110	C.3
CP SC 111	C.3
CP SC 120	C.3
CP SC 210	C.3
CP SC 211	C.1
E G 209	C.1
ED F (AG ED, THRD) 480	C.3
ENGR 120	C.1
I E 320	C.2
M E 205	C.1
NURS 140	C.3
PRTM (FOR) 209	C.3

C. Mathematical Sciences 6 hours

EX ST 301	
MTHSC 101, 102, 106, 108, 115*, 116*, 203, 207, 301	

*Exception: MTHSC 115 and 116 may be used by students graduating in Early Childhood Education, Elementary Education, and Special Education only.

D. Physical or Biological

Science 8 hours

A two semester sequence in the same physical or biological science, each including a laboratory

ASTR 101/103, 102/104	
BIOL 101, 102, 103, 104, 110, 111	
CH 101, 102, 105, 106	
GEOL 101/103, 102, 112/114	

PH SC 107, 108

PHYS 122/124, 207, 208, 221/223, 222/224

E. Humanities 6 hours

- Three hours selected from sophomore literature courses (200 level only) or foreign language literature (300 level or higher)
 - ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210
 - FR 300, 400, 406, 407, 408, 499
 - GER 301, 302, 401, 402, 403
 - ITAL 301, 302, 400
 - SPAN 301, 303, 311, 401, 403, 404, 405, 406, 422, 499
- Three hours selected from the following:
 - A A H 101, 210
 - C H S H203
 - ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210, 350, 351, 353, 355, 356, 357, 380, 385, 386
 - FR 201, 202
 - GER 201, 202
 - HUM 301, 302, 306, 309
 - ITAL 201, 202
 - JAPN 201, 202
 - MUSIC 210, 311, 312, 313
 - PHIL 101, 102, 103, 303, 304, 315, 316, 317, 318, 320, 323, 324, 325, 326, 327, 330, 343, 344, 345
 - REL 101, 102, 301, 306, 307
 - RUSS 201, 202
 - SPAN 201, 202, 221
 - SPCH 365, 369
 - THEA 210, 315, 316, 317
 - W S 301

F. Social Science 6 hours

A A S 301	
AGRIC 105	
ANTH 201, 301, 320	
AP EC 202, 302, 309, 319, 490	
C H S H201, H202	
C R D 357, (AP EC) 361	
ECON 200, 201, 211, 212, 301, 302, (MGT) 306, 307, 308, 309, 310, 314, 315, 324, 404	
GEOG 101, 103, 301, 302, 303, 305, 306, 330, 340	
HIST 101, 102, 122, 172, 173, 300, 301, 302, 303, 304, 305, 307, 311, 312, 313, 314, 316, 318, 321, 322, 323, 325, 327, 328, 329, 330, 333, 338, 339, 340, 341, 342, 351, 354, 355, 361, 363, 365, 370, 372, 373, 374, 375, 377, 378, 380, 381, 384, 385, 386, 387, 390, 391, (F&RR) 392, 393	
PO SC 101, 102, 302, 361, 381, 480	
PRTM 201, 301	
PSYCH 201, 306, 308, 330, 333, 340, 344, 345, 352, 368, 370	
R S 301, (SOC) 401, (SOC) 459	
SOC 201, 202, 310, 311, 330, 331, 350, 351, (R S) 371, 380, 390, 391, 392, 393, 394, 396, 397	

COMPETENCY GOALS

A. Communication and Speaking Skills

A.1. English 101 and English 102

Students completing English 101 with a passing grade should be able to demonstrate the following knowledge and skills:

1. An understanding of and ability to use the full range of the writing process including invention, drafting, revising, and editing.
2. The ability to write about fictional and/or non-fictional texts, using correct form in quoting and documentation.
3. The capacity to write a unified, coherent short essay (2–4 pages) with a suitable introduction and conclusion, well-organized and sufficiently developed paragraphs, and enough detail to support their generalizations.
4. A basic control over sentence structure including not only grammatical correctness but also some evidence of syntactical maturity in terms of sentence length, complexity, and variety.
5. Basic competence in punctuation, spelling, and other mechanics.

Students completing English 102 with a passing grade should be able to demonstrate all the knowledge and skills required for English 101 plus the following:

1. The capacity to summarize, analyze, and evaluate college-level texts, including argumentative pieces expressing opinions different from their own.
2. The ability to use basic library resources including available databases to find sources.
3. The ability to incorporate existing research into their own writing, citing appropriate documentation.
4. The ability to organize and sustain the coherence of a longer (5–8 pages) expository or argumentative paper that avoids major logical fallacies, recognizes and responds to counterarguments, and shows a rhetorical awareness of audience.
5. Skills at using varied sentence structure and length and appropriate sentence style and diction.

A.2. Oral Communication

1. Anonymous evaluators of student oral assignments from oral communication courses will report that at least 90% of students' oral communication samples (viewed on video tape) meet or exceed the criteria for oral communication competencies established by the national Speech Communication Association, as outlined in the SCA "Oral Competency" assessment instrument, and endorsed by teachers of those courses.
2. Students who have taken oral communication courses will report that receiving constructive feedback from teachers based on the "Oral Competency" assessment instrument and being given the opportunity to perform orally again after constructive feedback enabled them to improve their oral communication.
3. Teachers will report that student oral communication in "O"-designated courses improved in response to constructive feedback based on the "Oral Competency" assessments.

A.3. Writing Intensive Courses

1. Anonymous evaluators of student portfolios from W courses will report that at least 90% of students' writing samples meet or exceed the criteria for acceptable writing endorsed by teachers of those courses.

Students who have taken W courses will report the following:

2. That the writing assignments improved their learning of course material.
3. That receiving constructive feedback on their writing and being given the opportunity to revise their writing enabled them to improve their writing.
4. That they believe effective writing is important to success in their respective fields.
5. Increased confidence in their ability to meet the professional demands of writing in the work place.

Teachers will report the following:

6. That writing assignments in W courses improved student learning of course material.
7. That student writing in W courses improved in response to constructive feedback.

B. Computer Skills

The Computer Skills requirement is intended to achieve three goals. The first goal is to prepare students for the use of computer technology in their personal and professional lives. The second goal is to assist the students in developing a set of skills in using the computer in the areas of management and organization of data and the communication of ideas. The third goal is to introduce the students to the legal, ethical, and moral implications of the continuing advances in information technology.

Following completion of the Computer Skills general education requirement, students will be competent in the operation of a number of standard computer tools, including word processors, spreadsheets, and communication tools (for example, electronic mail and remote file access). Students will be able to utilize these tools to present information in an organized and efficient manner. Students will also be able to interpret and accommodate current capabilities and future advances in computer technology, in the context of legal, ethical, and moral guidelines, to support their decision making.

C. Mathematical Sciences

An education that reflects only the restricted mathematical needs of the distant past is not adequate for students who will live their professional lives in the twenty-first century. Therefore, the mathematical sciences requirement is designed to achieve the following competency goals:

1. To develop in students a high level of mathematical literacy in order that they be able to adequately cope with the demands of an information-based age. This basic literacy may assume different forms, depending upon the students' academic curricula. For example, developing skills in applying the methods of modern data analysis and statistical inference, mastering the more classical deterministic methods of calculus, or (for future teachers of elementary school children) to actively engage fundamental mathematical concepts in the ways that we

- would have them to teach: to explore, investigate, validate, discuss, represent and construct.
2. To enable students to become confident in their ability to do mathematics and to grasp the implications of the many mathematical concepts that permeate our lives, concepts such as chance, rates of change, logic, and graphs.
3. To develop in students the ability to communicate and to reason mathematically because mathematics today involves much more than calculation. Clarification of the problem, formulating alternatives, developing appropriate tools, and analyzing the consequences are all part of mathematical communication and reasoning.

D. Physical or Biological Science

Science is required of Clemson undergraduates to achieve two goals. The first goal is to expose students to the scientific philosophy that the natural world is mechanistic and largely predictable, and can be systematically studied using empirical methods. Mastery of these methods requires particular reasoning skills. Following successful completion of the physical/biological science requirement, students should have an understanding of the relationship among hypotheses, experiments, and theories. They should be able to use the methods of scientific inquiry such as framing a question precisely, developing hypotheses, designing experiments, collecting and analyzing data, drawing conclusions and making a defensible claim.

The second goal is to familiarize the students with the major principles and theories of a particular science, its historical development, and its significance for a broader world. This knowledge will give students the factual basis needed to practice the scientific method successfully in a particular discipline.

E. Humanities

The humanities is a broad category of study concerned with human nature, thought, emotion, values, interrelations, and culture. Unlike the sciences and the social sciences, the field of humanities is designed principally to insure that all students receive a balance of courses which generally are not applied or performance based. Specifically, the courses which fulfill the humanities general education requirement should build the following competencies: a reflective habit of mind, self and social awareness, a knowledge and appreciation of the development of our culture and those foreign to ours, a heightened aesthetic and ethical sensibility, an understanding of the diverse forms of expression, the ability to think critically, and good communication skills. Humanities courses should develop as many of these competencies as possible.

F. Social Science

The general education social science requirement will introduce students to human social and cultural diversity. The courses will provide students with a deeper understanding of the causes and consequences of human actions, thereby increasing their awareness of global concerns. The social science courses will also reinforce communication skills and challenge students to enhance their critical thinking and intellectual development.

- Shaded boxes indicate the minors that are NOT accepted for the major.
- Numbers following the minors indicate the college offering the minor.

¹Cluster minor Group V is not acceptable for students in engineering majors.

Accounting (3)
Adult/Extension Education (1)
Aerospace Studies (3)
African American Studies (2)
Agricultural Business Management (1)
Anthropology (3)
Aquaculture, Fisheries, & Wildlife Biology (1)
Beef Cattle Production (1)
Biochemistry (1)
Bioengineering (4)
Biological Sciences (1)
Business Administration (3)
Ceramic Engineering (4)
Chemistry (4)
Cluster
Communications (2)
Computer Science (4)
Crop and Soil Environmental Science (1)
Early Intervention Specialist (5)
Economics (3)
Elementary Education (5)
English (2)
Entomology (1)
Environmental Science and Policy (4)
Environmental Engineering (4)
Finance (3)
Fine Arts (2)
Food Science (1)

[illegible][illegible][illegible]

Shaded boxes indicate the minors that are NOT accepted for the major.

MINORS

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COLLEGE OF ENGINEERING AND SCIENCE (4)

Biosystems Engineering (BS) ^{1,3}																			■									
Ceramic and Materials Engineering (BS) ³												■							■									
Chemical Engineering (BS) ¹																			■									
Chemistry (BA, BS)													■						■									
Civil Engineering (BS) ³																			■									
Computer Engineering (BS) ¹																			■									
Computer Information Systems (BS)																	■		■									
Computer Science (BA, BS)																	■		■									
Electrical Engineering (BS) ³																			■									
Engineering Analysis (BS) ¹																			■									
Geology (BA, BS)																			■									
Industrial Engineering (BS) ³																			■									
Mathematical Sciences (BA, BS)																			■									
Mechanical Engineering (BS) ³																			■									
Physics (BA, BS)																			■									
Textile Chemistry (BS)																			■									
Textile Management (BS)																			■									
Textile Science (BS)																			■									

COLLEGE OF HEALTH, EDUCATION, AND HUMAN DEVELOPMENT (5)

Early Childhood Education (BA)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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PROGRAMS AND DEGREES

Clemson University offers 75 undergraduate degree programs in the Colleges of Agriculture, Forestry, and Life Sciences; Architecture, Arts, and Humanities; Business and Public Affairs; Engineering and Science; and Health, Education, and Human Development.

MINORS

A minor consists of at least 15 semester credits, with no fewer than nine credits at the 300 level or higher. Courses used to fulfill general education requirements, options, and electives may be counted toward the minor. For bachelor of arts degree programs, courses may not be used to fulfill both the major and minor requirements. A student cannot major and minor in the same field. A minor may be declared with the written approval of the major advisor. The advisor shall contact the department offering the minor. A minor may be acquired with either the Bachelor of Arts or the Bachelor of Science degree. The minor will be posted to the student's transcript but not on the diploma. Specific requirements are detailed below.

Accounting

A minor in Accounting requires ACCT 201, 202, 204, 301, 302, and completion of one of the following sequences: (1) ACCT 303, 406, 410; (2) ACCT 322, 340, 445; or (3) ACCT 322, 404, 415.

Adult/Extension Education

A minor in Adult/Extension Education requires AG ED 403, 440, 445, and six additional credits selected from the following: AG ED 407, 428, 450, 482, PRMT 308.

Aerospace Studies

A minor concentration in Aerospace Studies requires A S 109, 110, 209, 210, 309, 310, 409, and 410. Completion of A S Leadership Laboratory and participation in cadet activities are mandatory. Students must compete for an allocation and be accepted into the Professional Officer Course before enrolling in A S 309. (A S 100 and 200 levels may be taken concurrently in the sophomore year.)

African American Studies

A minor concentration in African American Studies requires 15 credits at the 300 and 400 levels, distributed as follows:

- Group I—Three credits from A S 301 or 498.
- Group II—Three credits from GEOG 330, HIST 338, 339, 438.
- Group III—Three credits from ENGL 482, 483, HIST 311, 312, PO SC 381, SOC 460, THEA 317.
- Group IV—Three credits in any approved course in social sciences.
- Group V—Three credits in any approved course in humanities.

No course used to meet the requirements of a disciplinary major may be used to meet the African American Studies minor requirements. The courses in this minor are to be scheduled in consultation with the appropriate advisors. African American Studies advisors will provide all affected advisors with a list of approved courses prior to registration.

Agricultural Business Management

A minor in Agricultural Business Management requires AP EC 302, 309, 319 and at least two courses selected from AP EC 308, 351, 402, 409, 433, 452, 456, 460.

Anthropology

A minor concentration in Anthropology requires ANTH 201 and 15 hours from the following courses: ANTH 301, 320, 351, 401, 403, SOC 433. At least one course must be at the 400 level. Students majoring in English or Sociology and minoring in Anthropology may not count their major courses toward their minor or vice versa.

Aquaculture, Fisheries, and Wildlife Biology

A minor in Aquaculture, Fisheries, and Wildlife Biology requires W F B 350 and 12 credits selected from 300-level or higher wildlife and fisheries biology courses, except W F B 463 and 490.

Beef Cattle Production

A minor concentration in Beef Cattle Production requires AVS 202, 370, 390, 401; two credits from AVS 108, 210, 375, 455; and three credits from AVS 310, 353/354, 453, 470.

Biochemistry

A minor concentration in Biochemistry requires BIOCH 301, 423 or 431, 432, 433, 434 (13 credits), plus at least two credits from any other biochemistry courses at the 300 level or above, BIOSC 416, or a section of BIOSC 493 designated as oriented towards biochemistry or molecular biology.

Bioengineering

A minor in Bioengineering requires at least 15 credits and must include BIO E 302, 320 and 401. The remaining six credits may be chosen from BIO E 201, 420, 450, BIOSC 222, 223, (B E) 430, 458, 459, C M E 210, or E M 304, 320, or M E 301.

Biological Sciences

A minor in Biological Sciences requires 15 credits and must include both a lecture and corresponding laboratory in animal diversity (BIOSC 302/306 or 303/307) and a lecture and corresponding laboratory in plant diversity (BIOSC 304/308 or 305/309); remaining credits (minimum of seven) must be selected from BIOCH, BIOSC, or GEN courses numbered 300 or higher.

Business Administration

A minor in Business Administration requires ACCT 203 (or ACCT 201 and 202), ECON 200 (or ECON 211 and 212), FIN 306, LAW 322, MGT 301 and MKT 301. (A student's curriculum may require ACCT 201 and 202 or ECON 211 and 212, rather than the broader survey courses. In these cases, the student has already satisfied the accounting and economics requirement.)

Ceramic Engineering

A minor in Ceramic Engineering requires C M E 201, 202, 210, 302, 307, 308, and three credits selected from C M E 402, 403, 414, 430, and 450.

Chemistry

A minor concentration in Chemistry requires CH 101, 102, and 15 additional credits in Chemistry, at least nine of which must be at the 300 or 400 level, with the courses selected in consultation with the Department of Chemistry.

Cluster

The Cluster minor allows students a somewhat wider choice of course materials than is possible with the conventional subject-matter minor. The general requirement for the Cluster minor is 15 credits in courses numbered higher than 300, except where noted differently, chosen according to one of the plans listed below. Courses within the student's major area may not be included in the Cluster minor.

Group I—*Social Sciences*: anthropology, economics, geography, history, political science, psychology, sociology.

Group II—*Administration*: accounting, economics, finance, law, management, management science, marketing.

Group III—*Life Sciences*¹: biochemistry, biological sciences, genetics, microbiology.

Group IV—*Physical Sciences*¹: chemistry, geology, physics.

Group V—*Engineering*¹: courses in all engineering majors plus engineering mechanics and engineering graphics.

¹No course in the 100 series is acceptable toward the Cluster minor and not more than six hours in the 200 series are acceptable.

Communications

A minor concentration in Communications requires 18 credits distributed as follows:

General Communications Option—ENGL 231, 312, and either SPCH 360 or 361, PHIL 102, and six elective credits.

Advertising Option—APEC 351, ENGL 231 or 304, G C 104, PSYCH 330, and five elective credits.

Commerce Option—AP EC 351 or THRD 468, ENGL 231 or 304, SPCH 360 or 361, MGT 301, and six elective credits.

Politics Option—ENGL 312 and either SPCH 360 or 361, P O SC 341, 343, and six elective credits.

Elective credits are approved by the Chair of the Department of English or his/her representative.

Computer Science

A minor in Computer Science requires CP SC 102 or 210, 231, 340, plus at least six credits chosen from 300 level or higher computer science courses.

Crop and Soil Environmental Science

A minor in Crop and Soil Environmental Science requires AGRIC 104, CSENV 202, and nine or more credits at the 300 level or higher.

Early Intervention Specialist

The following coursework is required to meet the credentialing standard for Early Intervention Specialist: ED F 336, ED F 334 or PSYCH 340, ED SP 402, 468, HLTH 410, 411, 420 and SOC 311.

Economics

A minor concentration in Economics requires ECON 314, 315, and nine additional credits from economics courses numbered 300 or higher.

Elementary Education

A minor in Elementary Education requires ED 100, 460, ED F 301, 302, 334, and ED SP 402, plus one of the following: ED 451, 452, 487, or 488.

It is recommended that students planning to work toward certification in elementary education also take ED 401 during the semester they take ED 460. (This minor does not certify one to teach.)

English

A minor concentration in English requires 15 credits in English above the sophomore level, arranged as follows:

Group I—ENGL 111.

Group II—Three credits from ENGL 405, 406, 407, 408, 409, 410, 412, 413, 414, 415, 416, 417, 418.

Group III—Three credits from ENGL 422, 423, 424, 425.

Group IV—Six additional credits above the sophomore level, including at least three credits from the 400 level.

Department certification of proficiency in composition is required. (See discussion under major concentration in English.)

Entomology

A minor in Entomology requires ENT 301 and 12 credits of any other entomology courses at the 300 level or higher.

Environmental Engineering

A minor in Environmental Engineering requires at least 15 credits and must include EE&S 401 or EN SP 200. Six credits must be from EE&S 402, 410, 411, 430, (B E, I E) 484, or 485. Six credits must be from C E 342, CH 223, 411, 413, CH E 401, 450, EN SP 400, ENTOX 400, (ENT) 430, GEOL 408, MICRO 305, 410. Courses are to be selected in consultation with the Department of Environmental Engineering and Science.

Environmental Science and Policy

A minor in Environmental Science and Policy requires at least of 18 credits including EN SP 200, 400, and at least 12 credits from the following:

Group I—*Science and Engineering*: at least six credits: BIOSC 410, 441, 442, 443, 446, CH 413, CSENV 202, (B E) 408, 475, 490, EE&S 401, 402, 430, 485, ENT 300, 420, (ENTOX) 430, ENTOX 400, 421, FOR 206, W F B 414.

Group 2—*Resource Management*: at least two credits: AGRIC (EN SP) 315, B E 364, C R D 357, C M E 450, CSENV 404, EE&S 484, ECON 319, FOR 315, 406, GEOL 300, W F B 306, (BIOSC) 313, 350, 412, 462.

Group 3—*Environmental Policy and Social Impacts*: at least two credits: AP EC 433, ANTH 401, CR P 405, EN SP 431, 471, 472, HIST (F&R) 392, HLTH 431, LAW 429, PHIL 345, PSYCH 355, R S (SOC) 401, W F B 430.

Financial Management

A minor in Financial Management requires FIN 305, 306 or 311, 308, 312, and one of the following: a 400-level FIN course, FIN 307, or 399.

Fine Arts

A minor in Fine Arts requires HUM 301¹, 302¹ and 15 credits from the following courses, of which at least nine credits must be earned in courses numbered 300 or higher, and no more than nine credits in any discipline selected from the following: A A H (all courses), ART (all courses), ENGL 345, 346, 357, 445, 446, HUM 306, 309, LS 190, MUSIC (all courses), SPCH 363, 369, THEA (all courses).

¹Any student who was formerly enrolled in one of the following programs may substitute DSGN 151/152 for HUM 301, 302: Construction Science and Management, Design, Fine Arts, Landscape Architecture.

Food Science

A minor concentration in Food Science requires FDC SC 214, 401 and seven additional credits in food science courses numbered 300 or higher.

Forest Products

A minor in Forest Products requires 15 credits which must include the following: FOR 441, 442, and 443; with the remaining credits being selected from the following: FOR 221 (not for Forest Resources Management majors), 341, 440, 444, 446, and 447. Other courses at the 300 level or above may be selected with a Forest Products advisor's approval.

Forest Resource Management

A minor in Forest Resource Management requires either of the following:

1. Credits from the following: FOR 305, 310, 315, and a minimum of six credits, selected with a forestry faculty advisor's approval, from any forestry course (for a total of 15 credits).
2. A formal program of study developed by the student and forestry advisor, containing a minimum of 15 credits of forestry courses. Nine credits must be at the 300 level or higher.

Geography

The Geography minor consists of GEOG 101 or 103 plus 15 credits of geography at the 200, 300, or 400 level. At least one 400-level geography course must be taken. One of the following courses may be taken as part of the 15-credit, upper-level requirements but may not be substituted for the required 400-level geography course: R S (SOC) 401, (SOC) 471.

Geology

A minor concentration in Geology requires GEOL 101, 102, 103, and 12 additional credits drawn from 300-level and 400-level geology courses; at least one 400-level course must be included.

Great Works

The Great Works minor requires G W (ENGL) 301 plus one course from each of the following groups. Note: A minimum of nine credits must be at the 400 level.

Group I—*Classical Civilization*: Three credits from ENGL 403, 404, (SPCH) 491, HIST 354, 355, 450, PHIL 315, PO SC 451.

Group II—*Post-classical Literature*: Three credits from ENGL 408, 411, 414, 416, FR 400, 408, G W 403, GER 400, SPAN 303, 401.

Group III—*Philosophy, Religion, and Social Thought*: Three credits from ENGL 350, HIST 471, PHIL 316, 317, REL 301, 302, 401.

Group IV—*The Arts*: Three credits from A A H 423, 424, HUM 301, 302, MUSIC 315, 316, THEA 315, 316.

Group V—*The Sciences*: ENGL 434

Health Science

A minor in Health Science requires HLTH 298 plus 12 additional credits drawn from the 300- and 400-level health courses; at least one 400-level course must be included.

History

A minor concentration in History requires 15 credits in history at the 300 and 400 level. Three credits at the 400 level must be included.

Horse Production

A minor in Horse Production requires AVS 202, 310, 412 and eight credits from the following: AVS 205, 309, 310, 390, 405, 407.

Horticulture

A minor concentration in Horticulture requires HORT 101 and 12 additional credits of horticulture courses (excluding HORT 271, 408, 471), nine credits of which must be at the 300 level or higher.

Human Resource Management

A minor concentration in Human Resource Management requires 18 credits as follows: MA SC 310 or equivalent, MGT 301, 307, 400; plus two of the following: MGT 416, 425, 431, 435.

International Engineering and Science

The minor in International Engineering and Science, open to students in any major in the College of Engineering and Science, requires:

1. Completion of a foreign language through at least 202 and
2. Either
 - (a) Nine credits of engineering or science courses at the 300 level or higher transferred from a foreign institution during an approved study-abroad program of at least three months, or
 - (b) an approved international internship or research program in engineering or science of at least three months duration, plus nine credits chosen from 300 level or higher foreign language courses: ECON 310, 412, 413; and POSC 361, 362, 371, 373, 375, 472, 477, 478.

The international study, internship, or research program must be approved in advance by the Associate Dean for Undergraduate Studies of the College of Engineering and Science.

International Politics

A minor in International Politics requires PO SC 102 or 104; 361; and 12 additional credits chosen from the list below, of which at least three must be from Group I and at least three from Group II: Group I—*Comparative Politics*: PO SC 371, 373, 471, 472, 476, 477, 478. Group II—*International Politics*: PO SC 362, 363, 367, 428, 457, 465.

With the approval of the Political Science department chair, PO SC 310, 311, 389, 479, and 489 may be applied to the requirements for the International Politics minor. Students majoring in Political Science may not minor in International Politics.

Legal Studies

A minor in Legal Studies requires 15 credits at the 300–400 level at least six credits of which must be selected from Group I, at least six credits of which must be selected from Group II, and the remaining three credits of which can be selected from either group at the student's option¹:

Group I—HIST 328, 329, 496, PHIL 343, PO SC 432, 433, 434, SOC 390.

Group II—LAW 312, 313, 322, 333, 401, 402, 405, 420, 429, 499.

¹Additional courses may be approved by a committee composed of a representative selected by the Dean of the College of Architecture, Arts, and Humanities and a representative selected by the Dean of the College of Business and Public Affairs.

²Courses selected by students in BA curricula for their major department to fulfill major requirements cannot also be used to satisfy requirements of this minor.

Management

A minor in Management requires 18 credits as follows: MA SC 310 or equivalent, MGT 301, 307, 390, 418, 422.

Marketing

A minor concentration in Marketing requires MKT 301, 302, 426 or 428 or 429, and six additional credits in marketing.

Mathematical Sciences

A minor in Mathematical Sciences requires MTHSC 208 and 12 additional credits in mathematical sciences courses numbered 300 or higher.

Microbiology

A minor concentration in Microbiology requires MICRO 305 and eleven additional credits drawn from 400-level microbiology courses.

Modern Languages

A minor concentration in Modern Languages requires 15 credits in one modern language from courses at the 300 and 400 levels, including at least one course at the 400 level. In French, one of the 300-level courses must be FR 305.

Music

A minor concentration in Music requires MUSIC 151, 152, 205, 206, 251, 252; 315 or 316; four semesters of ensemble, totaling four credits, selected from MUSIC 361, 362, 363, 364, 365, 366, 367, and 369; and one three-hour 300/400-level music course.

Natural Resource Economics

A minor concentration in Natural Resource Economics requires AP EC 403 and C R D 357 and three courses selected from the following: AP EC 308, 352, 402, 433, 452, AP EC (C R D) 412, R S (SOC) 401.

Operations Management

A minor in Operations Management requires 18 credits as follows: MA SC 310 or equivalent, MGT 301, 390, 400, 404; plus one of the following: MGT 402 or 408.

Packaging Science

A minor in Packaging Science requires 18 credits and must include PKGSC 102, 202, 204 and 206. The remaining nine credits may be selected from FD SC 401, 402, FOR 441, 442, 443, G C 405, 406, PKGSC 368, 401, 404, 454, 464, 466.

Parks, Recreation, and Tourism Management

A minor in Parks, Recreation, and Tourism Management requires PRTM 301 (preferred) or PRTM 101 and 15 credits taken in one of these options: *Community Leisure Services*—PRTM 205, 321 and nine additional credits from PRTM 307, 400, 403, 421, 441.

Non-profit Leadership—PRTM 205, 308, 321, 421, MKT 429 and a 400-hour cooperative education field experience. Admission to this minor is through application to the Department of Parks, Recreation, and Tourism Management prior to registering for any of the courses.

Recreation Resource Management—PRTM 270, 330, 474 and six additional credits from PRTM 320, 403, 431.

Sport Management—PRTM 205, 254, 454, and six credits from PRTM 318, 441, 452, and 453.

Therapeutic Recreation—PRTM 311, and 12 additional credits in parks, recreation, and tourism management, nine of which must be taken from PRTM 314, 315, 316, 318, 411, 412, 413.

Travel and Tourism—PRTM 342 and 12 additional credits from PRTM 343, 344, 349, 445, 446, either (GEOG) 430 or 447.

Philosophy

A minor concentration in Philosophy requires 15 credits in philosophy. These 15 credits may include one 100-level philosophy course (PHIL 101, 102, or 103). PHIL 401 or 402 must be included.

Physics

A minor concentration in Physics requires PHYS 122, 221 and 222, and nine additional credits in physics courses at the 300 level or higher.

Plant Pathology

A minor concentration in Plant Pathology requires PL PA 401 and 12 credits from the following: any 300/400-level plant pathology courses, BIOSC 418, 425, 426, I P M 401, MICRO 305.

Political Science

A minor in Political Science requires PO SC 101, 102, or 104 plus 15 additional credits at the 300–400 level, nine of which must be selected from three different fields of political science as follows:

American Government—PO SC 403, 405, 432, 442.

Comparative Politics—PO SC 371, 373, 471, 472, 476, 477, 478.

International Politics—PO SC 361, 362, 363, 428, 465.

Political Theory—PO SC 451, 452, 453.

Public Policy and Public Administration—PO SC 302, 321, 421, 423, 424.

At least one 400-level course must be included. No more than a total of three credits from PO SC 310, 311, and 312 may be applied to the requirements for a Political Science minor.

Poultry Science

A minor concentration in Poultry Science requires AVS 201 and 12 additional credits from AVS 110, 323, 355, 400, 402, 451, 452, 458.

Psychology

A minor concentration in Psychology requires PSYCH 201, and 205 or 210 (except for Sociology majors) and 15 credits from 300- and 400-level psychology courses. At least one 400-level course must be included.

Religion

A minor in Religion requires REL 101 plus 12 credits in religion courses numbered above 300, including either REL 401 or 402. PHIL 303 and SOC 432 may be included in the minor, provided that they are not counted towards meeting requirements for a major in those fields.

Science and Technology in Society

A minor in Science and Technology in Society requires 15 credits, at least six of which must be on the 400 level. No course that is used to meet the requirements of a disciplinary major may also be used to meet the Science and Technology in Society minor requirements. See advisor for list of approved courses.

Secondary Education

A minor in Secondary Education requires ED 100, 498, ED F 301, 302, 335, and ED SP 402, plus one of the following: ED 424, 425, 426, 427, or 428.

Sociology

A minor concentration in Sociology requires SOC 201 and 15 credits from sociology and rural sociology courses numbered 300 or higher. At least one 400-level course must be included.

Spanish-American Area Studies

A minor concentration in Spanish-American Area Studies requires the equivalent of SPAN 202, plus 15 credits distributed as follows: six credits from HIST 340, 341, 342, 440; six credits from SPAN 305, 308, 311, 411; and ECON 410.

Speech and Communication Studies

A minor in Speech and Communication Studies requires SPCH 150 and 12 additional hours in Speech, nine of which must be at the 300–400 level. Three hours at the 400 level must be included.

Textiles

A minor in Textiles requires 15 credits from the following: TEXT 201, 202, 460, and any other approved textile course such as TEXT 308, 314, 416, 426, 428, 440, 470, 471, 472, 475, 476.

Theatre

A minor concentration in Theatre requires 20 credits arranged as follows: three credits of dramatic literature and history (ENGL 404, 410, 411, 412, 430, THEA 347); three credits of theatre history (THEA 315, 316, 317); six credits in a sequence (THEA 315/316, 347/447, 372/472, 375/479, 376/476, 377/477 or 487 or 497); six credits in THEA at the 300–400 level; and two credits of THEA 279.

Urban Forestry

A minor in Urban Forestry requires a minimum of 16 credits, distributed as follows:

Group I—FOR (HORT) 309, 450, 480, HORT 208.

Group II—A minimum of three credits selected from CR P 411, 415, 472, HORT 308.

Group III—A minimum of three credits selected from ENT 401, HORT 303, PL PA 402.

Women's Studies

A minor in Women's Studies requires 15 credits at the 300 and 400 level, distributed as follows:

Group I—Six credits: W S 301 and 498.

Group II—Six credits chosen from core courses: ENGL 380, 436, HIST 318, PSYCH 308, SOC 461, and any additional courses approved for Group II.

Group III—The final three credits may be earned by taking any approved Women's Studies minor course.

Courses selected in Groups II and III must represent at least two disciplines. No course that is used to meet the requirements of a disciplinary major may also be used to meet the Women's Studies minor requirements. The courses for this minor are to be scheduled in consultation with the appropriate advisors. The Women's Studies advisor will provide all affected advisors with a list of approved courses prior to registration.

Writing

A minor in writing requires 15 credits as follows: *Business and Technical Option*—AP EC 351 or G C 104, CP SC 120, ENGL 304 or 314, 490, 495.

Journalism Option—ENGL 231, 333, 334, 335; one of the following: AP EC 351, CP SC 120, G C 104, ENGL 217, 304, 312, 314, PHIL 102, SPCH 250, THRD 468, and any course approved by the Chair of the English Department.

Writing Pedagogy Option—ENGL 312, 400, 401, 485; elective (three credits), any 300- or 400-level writing course offered by the Department of English.

Creative Writing Options

Drama—THEA (ENGL) 347, 447 (six credits), ENGL 430, and one of the following: ENGL 312, 410, 411.

Fiction—ENGL 345, 445 (six credits), 432, and one of the following: ENGL 312, 418, 425, 426.

Poetry—ENGL 346, 446 (six credits), 431, and one of the following: ENGL 312, 413, 416, 417.

PREPROFESSIONAL STUDIES

Clemson University will award the degree of Bachelor of Arts or Bachelor of Science in Preprofessional Studies to a student who is pursuing a degree in a professional school. The student must have also satisfactorily completed three years of undergraduate work in an appropriate curriculum and the first year of work in an accredited medical, dental, veterinary, law, or other accredited, professional school, provided the student fulfills the requirements for the three-year program as follows and the other specified conditions are met.

1. At least two of the three years of preprofessional work, including the third year, must be taken in residence at this University.

2. A minimum of three years of undergraduate work (i.e. preprofessional school credit) must be presented.

3. Normal progress must have been made toward fulfilling the degree requirement of the curriculum in which the student is enrolled at Clemson.

4. The student applying for the Bachelor of Arts or Bachelor of Science in Preprofessional Studies must be recommended by the college at Clemson in which the curriculum that he/she is majoring as a Clemson student is located or by the college in which three years of normal progress toward a degree can be identified.

5. If the combination of preprofessional work taken and the work in the first year of professional school is equivalent to that which is required in some other bachelor's degree program at Clemson, the college concerned may recommend the other bachelor's degree.

The above requirements and conditions became effective July 1, 1974, and will apply to all students who satisfy these requirements and conditions after that date.

A Clemson student having left the University before receiving the bachelor's degree (prior to July 1, 1974) and having enrolled immediately in an accredited, professional, postgraduate school may apply for a bachelor's degree from Clemson and have his/her application considered on an individual basis. The college(s) at Clemson considering the application are authorized to examine the student's entire record in both preprofessional and professional studies and exercise their own judgment concerning the three-year requirement for Preprofessional Studies.

SECOND BACCALAUREATE DEGREE

To complete a second baccalaureate degree, a student must complete a minimum of 30 semester hours at Clemson in addition to the greater number of hours required for either degree and satisfy all course and grade requirements for the second degree.

DOUBLE MAJOR

A student in a Bachelor of Arts degree program may be awarded a single baccalaureate degree with a double major. The two majors may be within a single college or may involve two colleges but are limited to Bachelor of Arts degree programs.

GRADUATE DEGREES

Programs leading to graduate degrees are available in all five colleges—Agriculture, Forestry, and Life Sciences; Architecture, Arts, and Humanities; Business and Public Affairs; Engineering and Science; and Health, Education, and Human Development. One hundred and twelve graduate degree programs are offered. The degrees of Doctor of Philosophy, Doctor of Education, Education Specialist, Master of Arts, Master of Science, Master of Agricultural Education, Master of Agriculture, Master of Architecture, Master of Business Administration, Master of City and Regional Planning, Master of Construction Science and Management, Master of Education, Master of Engineering, Master of Fine Arts, Master of Forest Resources, Master of Health Administration, Master of Human Resource Development, Master of Industrial Education, Master of Parks, Recreation, and Tourism Management, Master of Professional Accountancy, and Master of Public Administration are awarded to students who satisfactorily complete prescribed graduate programs.

For further information concerning advanced degrees, see the *Graduate School Announcements*, available from the Graduate School Office.

COLLEGE OF AGRICULTURE, FORESTRY, AND LIFE SCIENCES

The College of Agriculture, Forestry, and Life Sciences offers a broad range of academic degree programs providing a sound knowledge base and technical expertise in the basic and applied sciences including the life sciences. The Bachelor of Science degree is available in 21 academic programs; the Bachelor of Arts is offered in Biological Sciences.

Preprofessional Health Studies non-degree programs are offered in Premedicine, Prepharmacy, Rehabilitation Sciences, and Preventive Medicine. A bachelor's degree can be obtained by fulfilling additional requirements specified by the University.

The undergraduate academic programs include Agricultural and Applied Economics with options in Agricultural Economics and Community and Rural Development; Agricultural Education; Agricultural Mechanization and Business; Animal and Veterinary Sciences with options in Dairy Business, Equine Business, Food Animal Business, Poultry Business, and Preventive and Science; Aquaculture, Fisheries, and Wildlife Biology; Biochemistry; Biological Sciences; Biosystems Engineering; Crop and Soil Environmental Science with study areas in Agronomic Systems, Environmental Agronomy, Soil and Environment, and Weed Science; Entomology; Food Science; Forest Products; Forest Resource Management; Horticulture with a Turfgrass option; Microbiology with a Molecular Biology option; Packaging Science; and Plant Pathology.

The academic departments in the College of Agriculture, Forestry, and Life Sciences are organized by school. The School of Animal, Biomedical, and Biological Sciences consists of the Departments of Animal and Veterinary Sciences, Biological Sciences, Microbiology and Molecular Medicine, and the faculty of the Biology Program. The School of Applied Science and Agribusiness includes the Departments of Agricultural and Applied Economics, Agricultural and Biological Engineering, Food Science, Packaging Science, and the faculty of Agricultural Education. The School of Natural Resources includes the Departments of Aquaculture, Fisheries, and Wildlife; Environmental Toxicology; and Forest Resources. The School of Plant, Statistical, and Ecological Sciences consists of the Departments of Entomology, Horticulture, Plant Pathology and Physiology, Crop and Soil Environmental Science, and the faculty of Experimental Statistics.

Minors

The disciplines in the College offer minors to students who wish to broaden their educational background and enhance their expertise. (See page 30.)

Honors Program

Students with a cumulative grade-point ratio of 3.4 and above are urged to consider enrolling in the Honors Program. The College offers Honors designated courses and an opportunity to do a research

project under the direction of a faculty mentor in fulfillment of Senior Departmental Honors. For more information, contact the Calhoun College Honors Program Office in Brackett Hall.

Scholarships

A range of scholarships is available to students who excel in their academic performance. Information on scholarships and financial aid can be obtained from specific departments in the College or from the Student Financial Aid Office in Sikes Hall.

Student Services

The college has a comprehensive Student Service Center to assist students. The Center includes a career library, company literature, career search technology, and video/audio resources.

AGRICULTURAL AND APPLIED ECONOMICS Bachelor of Science

AGRICULTURAL ECONOMICS

The Agricultural Economics curriculum emphasizes a strong background in economics with applications to production agriculture, agribusiness, natural resources, and the environment. Courses are also included in basic agricultural and biological sciences, liberal arts, and business. Students have 18 hours of electives to use to further individual specialization or to broaden the educational experience.

Employment opportunities for graduates in Agricultural Economics are many and diverse. Private sector opportunities include agricultural production, banking, finance, marketing, and public relations. Public sector opportunities include national/local organizations, government agencies, educational institutions, and cooperative extension services. Graduates have also begun businesses or returned to family-owned businesses. This major also provides an excellent background for professional or graduate study in several disciplines.

Students in the Agricultural Economics curriculum take a basic set of courses during the freshman and sophomore years. During the junior and senior years, students concentrate in one of five study areas: Agricultural Business, Economics, International Trade and Development, Production, and Real Estate. Students should select one of the five areas by the end of the sophomore year.

Freshman Year

First Semester

- 3 - AGRIC 103 Intro. to Animal Industries
- 3 - AGRIC 105 Agriculture and Society
- 3 - ENGL 101 Composition I
- 3 - MTHSC 102 Intro. to Mathematical Analysis
- 4 - Science Requirement¹

16

Second Semester

- 3 - AGRIC 104 Introduction to Plant Sciences
- 3 - AP EC 202 Agricultural Economics
- 3 - CP SC 120 Issues in Computers
- 3 - ENGL 102 Composition II
- 4 - Science Requirement¹

16

Sophomore Year

First Semester

- 3 - AP EC 302 Economics of Farm Management
- 3 - ECON 212 Principles of Macroeconomics
- 3 - Accounting Requirement²
- 6 - Humanities Requirement E.1 and E.2¹
- 3 - Elective

18

Second Semester

- 3 - AP EC 308 Quantitative Applied Economics
- 3 - AP EC 309 Econ. of Agricultural Marketing
- 3 - EX ST 301 Introductory Statistics
- 3 - Accounting Requirement²
- 3 - Oral Communication Requirement¹
- 3 - Elective

18

Junior Year

First Semester

- 3 - ECON 314 Intermediate Microecon. Theory
- 3 - EX ST 462 Statistics Applied to Economics
- 3 - R S 301 Rural Sociology or
- 3 - R S (SOC) 459 The Community
- 3 - Study Area³

- 3 - Writing Intensive Requirement¹

15

Second Semester

- 3 - AP EC 420 World Agricultural Trade or
- 3 - AP EC 460 Agricultural Finance
- 3 - ECON 302 Money and Banking or
- 3 - ECON 315 Intermed. Macroecon. Theory
- 3 - LAW 312 Commercial Law or
- 3 - LAW 322 Legal Environment of Business

- 6 - Study Area³

- 3 - Elective

18

Senior Year

First Semester

- 3 - AP EC 402 Production Economics
- 3 - AP EC (CSENV) 426 Crop. Systems Analysis
- 3 - AP EC 452 Agricultural Policy
- 3 - Study Area³

- 3 - Elective

15

Second Semester

- 3 - AP EC 456 Prices
- 6 - Study Area³

- 6 - Elective

15

131 Total Semester Hours

¹See General Education Requirements.

²Two-semester sequence: ACCT 201 and 202, or 203 and 307.

³See advisor. A study area should be selected by the end of the sophomore year in consultation with advisor. Select 18 credits from one of the following:

Agricultural Business—MGT 301, 307, MKT 301, and nine credits from a department approved list.

Economics—ECON 430, MTHSC 207, 210, and nine credits from a department approved list.

International Trade and Development—Six credits of AP EC 490 or two courses of the same foreign language, ECON 310 or 412, and nine credits from a department approved list.

Production—Eighteen credits from a department approved list.

Real Estate—AP EC 313, 413, FIN 307, 417, and six credits from a department approved list.

AGRICULTURAL AND APPLIED ECONOMICS

Bachelor of Science

COMMUNITY AND RURAL DEVELOPMENT

The Community and Rural Development curriculum provides students with knowledge to deal with social, economic, and international development issues. Students learn about natural resources and basic principles in several disciplines. Associations between natural resources and social, economic, and political institutions are studied. This curriculum provides the necessary conceptual, analytical, and pragmatic qualifications to function as an economic development specialist. Students receive practical training, and internships are available to complement the coursework in this curriculum.

A bachelor's degree with a major in Community and Rural Development will qualify students for employment with local, state, regional, federal, and international agencies; with private businesses; research and consulting firms; financial institutions and commissions; and utilities; and for organizations requiring entrepreneurial skills. This major also provides an excellent background for professional or graduate study in several disciplines.

Freshman Year

First Semester

- 3 - AGRIC 105 Agriculture and Society
- 3 - ENGL 101 Composition I
- 3 - GEOG 101 Introduction to Geography
- 3 - MTHSC 101 Introduction to Probability
- 4 - Science Requirement¹

16

Second Semester

- 3 - ENGL 102 Composition II
- 3 - MTHSC 102 Intro. to Mathematical Analysis
- 3 - Computer Skills Requirement¹
- 3 - Humanities Requirement¹
- 4 - Science Requirement¹

16

Sophomore Year

First Semester

- 3 - AG M 301 Soil and Water Conservation or
- 4 - CSENV 202 Soils
- 3 - AP EC 202 Agricultural Economics
- 3 - EX ST 301 Introductory Statistics
- 3 - Literature Requirement¹

12-13

Second Semester

- 3 - ACCT 201 Accounting Concepts I
- 3 - ECON 212 Principles of Macroeconomics
- 3 - PO SC 102 Introduction to Global Issues
- 3 - R S 301 Rural Sociology
- 3 - SPCH 250 Public Speaking
- 3 - Writing Intensive Requirement¹

18

Junior Year

First Semester

- 3 - ECON 314 Intermediate Microeconomics
- 3 - EX ST 462 Statistics Applied to Economics
- 3 - RS (SOC) 459 The Community
- 3 - Social Science Requirement¹
- 3 - Specialization¹
- 2 - Elective

17

Second Semester

- 3 - AP EC 352 Public Finance
- 3 - C R D 357 Natural Resources Economics
- 3 - R S (SOC) 401 Human Ecology
- 3 - Commerce and Industry Requirement¹
- 3 - Specialization¹
- 2 - Elective

17

Senior Year

First Semester

- 3 - C R D (AP EC) 411 Regional Impact Analysis
- 3 - R S (SOC) 471 Demography
- 3 - Advanced Social Science Requirement⁶
- 3 - Planning Requirement⁷
- 3 - Specialization¹
- 3 - Elective

18

Second Semester

- 3 - AP EC 403 Land Economics
- 3 - C R D (AP EC) 412 Spatial Competition and Rural Development
- 3 - C R D (AP EC) 491 Internship
- 5 - Specialization¹
- 3 - Elective

17

131-132 Total Semester Hours

¹See General Education Requirements.²ENGL 202, 208, 209.³Select from 200- or 300-level courses in geography, history, political science, psychology, sociology.⁴See advisor.⁵ECON 302, 315, 410, MGT 301, 305, 307, MKT 301.⁶Select from 300- or 400-level courses in geography, history, political science, psychology, sociology.⁷C R P 411, 415, 472.

AGRICULTURAL EDUCATION

Bachelor of Science

Agricultural Education provides broad preparation in agricultural sciences and professional education, including communications and human relations skills. In addition to required courses, students may select a minor concentration. (See page 30.) Students in other departments within the College may minor in Agricultural Education and be certified to teach when they meet the minimum requirements.

The Bachelor's degree prepares students for professional education positions in the mainstream of agriculture including teaching, cooperative extension service, and government agricultural agencies. This degree also prepares students for other educational work such as agricultural missionary, public relations, and training officers in agricultural industry.

Freshman Year

First Semester

- 3 - AGRIC 103 Intro. to Animal Industries
- 3 - AGRIC 200 Agricultural Applications of Microcomputers
- 4 - BIOL 103 General Biology I
- 3 - ENGL 101 Composition I
- 3 - Mathematical Sciences Requirement¹

16

Second Semester

- 1 - AG ED 100 Orientation and Field Experience
- 3 - AGRIC 104 Introduction to Plant Sciences
- 4 - BIOL 104 General Biology II
- 3 - ENGL 102 Composition II
- 3 - Mathematical Sciences Requirement¹
- 1 - Elective

15

Sophomore Year

First Semester

- 3 - AG ED 201 Intro. to Agricultural Education
- 3 - AG M 205 Principles of Farm Shop or
- 3 - AG M 206 Agricultural Mechanization
- 4 - CH 101 General Chemistry or
- 4 - CH 105 Beg. Gen. and Organic Chemistry
- 3 - HIST 322 History of Technology or
- 3 - HIST 323 Hist. of American Technology
- 3 - Humanities Requirement E.2¹

16

Second Semester

- 3 - AP EC 202 Agricultural Economics
- 4 - CH 102 General Chemistry or
- 4 - CH 106 Beg. Gen. and Organic Chemistry
- 3 - HORT 208 Landscape Appreciation
- 3 - Literature Requirement¹
- 3 - Elective

16

Junior Year

First Semester

- 3 - AG M 301 Soil and Water Conservation or
- 3 - AG M 452 Farm Power
- 3 - AP EC 302 Economics of Farm Management
- 4 - CSENV 202 Soils
- 4 - ENT 301 General Entomology
- 6 - Minor¹

20

Second Semester

- 3 - AVS 370 Principles of Animal Nutrition
- 3 - ED F 302 Educational Psychology
- 3 - SPCH 250 Public Speaking
- 6 - Minor¹
- 3 - Writing Intensive Requirement¹

18

Senior Year

First Semester

- 1 - AG ED 400 Supervised Field Experience II
- 2 - AG ED 423 Curriculum
- 2 - AG ED 425 Teaching Agricultural Mechanics
- 3 - FOR 305 Elements of Forestry
- 3 - PL PA 401 Plant Pathology
- 3 - Minor¹
- 4 - Elective

18

Second Semester

- 3 - AG ED 401 Methods in Agricultural Educ.
 - 12 - AG ED 406 Directed Teaching
 - 3 - Elective
-
- 18

137 Total Semester Hours

¹See General Education Requirements.²ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.³A minor is recommended. See advisor for available minors and course requirements.

AGRICULTURAL MECHANIZATION AND BUSINESS

Bachelor of Science

The Agricultural Mechanization and Business major provides an educational program for undergraduate students who desire training in areas relevant to dynamic agricultural enterprise. The program is organized with strength in both business management and technical support of agriculture and agribusiness. To produce well rounded individuals with good communication skills, the curriculum includes courses in the humanities, social sciences, English composition, and public speaking.

The graduate with a major in Agricultural Mechanization and Business can find meaningful and remunerative employment in a variety of situations directly and indirectly related to agricultural production, processing, marketing, and the many services connected therewith. Farming and technical sales in the agricultural, industrial, and heavy equipment industries are frequently chosen careers.

By completing this curriculum, the graduate will have fulfilled the requirements for an Agricultural Business Management minor and will be so noted on the transcript.

Freshman Year**First Semester**

- 1 - AG M 101 Intro. to Mechanization and Bus.
 - 4 - BIOL 103 General Biology I
 - 4 - CH 101 General Chemistry
 - 3 - ENGL 101 Composition I
 - 3 - Mathematical Sciences Requirement¹
-
- 18

Second Semester

- 3 - AGRIC 104 Introduction to Plant Sciences
 - 4 - BIOL 104 General Biology II
 - 4 - CH 102 General Chemistry
 - 3 - ENGL 102 Composition II
 - 3 - Mathematical Sciences Requirement¹
-
- 17

Sophomore Year**First Semester**

- 3 - AG M 205 Principles of Farm Shop
 - 3 - AP EC 202 Agricultural Economics
 - 4 - PHYS 207 General Physics I
 - 3 - Computer Skills Requirement²
 - 3 - Literature Requirement³
-
- 16

Second Semester

- 3 - ACCT 201 Accounting Concepts I
 - 3 - AG M 206 Agricultural Mechanization
 - 3 - AG M 303 Calculations for Mechanized Agric.
 - 2 - E G 209 Intro. to Engr./Comp. Graphics
 - 4 - PHYS 208 General Physics II
 - 3 - Social Science Requirement⁴
-
- 18

Junior Year**First Semester**

- 3 - AG M 301 Soil and Water Conservation
 - 3 - AG M 406 Mechanical and Hydraulic Systems
 - 3 - AP EC 302 Economics of Farm Management
 - 3 - Social Science Requirement⁴
 - 3 - Minor⁵
 - 3 - Elective
-
- 18

Second Semester

- 3 - AP EC 309 Econ. of Agricultural Marketing
 - 4 - CSENV 202 Soils
 - 3 - SPCH 250 Public Speaking
 - 3 - Humanities Requirement E.2²
 - 3 - Writing Intensive Requirement²
-
- 16

Senior Year**First Semester**

- 3 - AG M 402 Drainage, Irrig. and Waste Mgt.
 - 3 - AG M 452 Farm Power
 - 3 - AG M 460 Farm and Home Utilities
 - 1 - AG M 472 Seminar
 - 3 - AP EC 319 Agribusiness Management
 - 3 - Minor⁵
-
- 16

Second Semester

- 1 - AG M 401 Environmental Control for Plants and Animals
 - 2 - AG M 403 Structures for Plants and Animals
 - 3 - AG M 408 Equipment Sales and Service
 - 3 - Agriculture Requirement⁶
 - 7 - Elective
-
- 16

135 Total Semester Hours

¹A minimum of six credits to be selected from EX ST 301 or MTHSC 101; MTHSC 102; MTHSC 106.²See General Education Requirements.³ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.⁴ED F 302, GEOG 101, 301, 302, HIST 101, 102, 172, 173, PO SC 101, PSYCH 201, SOC 201, 401, or any AP EC and R S courses.⁵Select from Agricultural Business Management minor list.⁶See advisor.

ANIMAL AND VETERINARY SCIENCES

Bachelor of Science

The curriculum in Animal and Veterinary Sciences provides students with a broad base of understanding of scientific principles and the application of these principles to scientific, technical, and business phases of livestock and poultry production, processing, and marketing. Completion of general education requirements, basic sciences, applied sciences, and student-selected courses of personal in-

terest prepares graduates well for successful careers. All students complete a common freshman year; the curriculum is then divided into five options: Dairy Business, Equine Business, Food and Animal Business, Poultry Business, and Pre Veterinary and Science. Each option includes specialized courses unique to students pursuing careers in those options.

Many opportunities are available to Animal and Veterinary Sciences graduates, including production, sales and marketing, business management, advertising, extension, meat and dairy industry, and teaching. Graduates in the Pre Veterinary and Science Option also meet all requirements for admission to graduate and professional schools including the veterinary medicine programs for the University of Georgia and Tuskegee University.

Freshman Year Program**First Semester**

- 1 - AVS 100 Orientation to Animal, Dairy, and Veterinary Sciences
 - 4 - AVS 202 Introductory Animal Science
 - 4 - BIOL 103 General Biology I or
 - 5 - BIOL 110 Principles of Biology I
 - 4 - CH 101 General Chemistry
 - 3 - ENGL 101 Composition I
-
- 16-17

Second Semester

- 1 - AVS 108 Animal and Dairy Sci. Techniques
 - 4 - BIOL 104 General Biology II or
 - 5 - BIOL 111 Principles of Biology II
 - 4 - CH 102 General Chemistry
 - 3 - ENGL 102 Composition II
 - 3 - MTHSC 102 Intro. to Math. Analysis or
 - 4 - MTHSC 106 Calculus of One Variable I
-
- 15-17

DAIRY BUSINESS OPTION**Sophomore Year****First Semester**

- 1 - AVS 203 Dairy Science Techniques
 - 3 - ACCT 201 Accounting Concepts I or
 - 3 - ACCT 203 Financial Accounting
 - 4 - CSENV 202 Soils
 - 4 - SPAN 101 Elementary Spanish
 - 3 - Computer Skills Requirement¹
 - 3 - Humanities Requirement E.1¹
-
- 18

Second Semester

- 3 - AVS 310 Animal Disease and Sanitation
 - 3 - AP EC 202 Agricultural Economics
 - 4 - SPAN 102 Elementary Spanish
 - 3 - SPCH 250 Public Speaking
 - 1 - Animal Techniques Requirement²
 - 3 - Elective
-
- 17

Junior Year**First Semester**

- 3 - AVS 370 Principles of Animal Nutrition
 - 4 - AVS 404 Dairy Cattle Feeding and Mgt.³
 - 4 - AN PH 301 Physiology and Anatomy of Domestic Animals
 - 3 - AP EC 302 Econ. of Farm Management
 - 4 - MICRO 305 General Microbiology
-
- 18

Second Semester

- 2 - AVS 302 Principles of Livestock Selection
- 3 - AVS 375 Applied Animal Nutrition
- 2 - AVS 461 Physiology of Lactation
- 3 - CSENV 423 Field Crop—Forages
- 1 - Animal Techniques Requirement²
- 3 - Business Requirement⁴
- 3 - Humanities Requirement E.2¹
- 1 - Elective

18

Senior Year**First Semester**

- 2 - AVS 406 Seminars and Related Topics
- 4 - AVS 430 Dairy Processing I
- 3 - EX ST 301 Introductory Statistics
- 4 - Animal Production Requirement³
- 3 - Writing Intensive Requirement¹

16

Second Semester

- 3 - AVS 453 Animal Reproduction
- 3 - AVS 470 Animal Breeding
- 3 - Business Requirement⁴
- 7 - Elective⁵

16

134-137 Total Semester Hours

¹See General Education Requirements.²See advisor. Select from AVS 120, 204, or 210.³AVS 404 is taught in the fall semester of even-numbered years and may be taken in the senior year. See advisor for scheduling alternatives.⁴See advisor. Select from AG M 205, 401, 402, 403, 460, AGRIC (EN SP) 315, AP EC 309, 319, 351, 409, 433, 460, CSENV (B E) 408, ECON 211, 212, EN SP 432, LAW 312, 313, MGT 301, 307.⁵See advisor. Select from AVS 401, 402, 408, 412, or 431. May be taken either first or second semester of senior year.⁶Electives may be taken in the first semester of the senior year if necessary.**EQUINE BUSINESS OPTION****Sophomore Year****First Semester**

- 1 - AVS 204 Horse Care Techniques
- 3 - ACCT 201 Accounting Concepts I or 3 - ACCT 203 Financial Accounting
- 3 - AP EC 202 Agricultural Economics
- 4 - SPAN 101 Elementary Spanish
- 3 - Humanities Requirement E.1¹
- 3 - Computer Skills Requirement¹

17

Second Semester

- 2 - AVS 205 Light Horse Management
- 3 - AVS 310 Animal Disease and Sanitation
- 3 - AGRIC 104 Intro. to Plant Sciences or 4 - CSENV 202 Soils
- 4 - SPAN 102 Elementary Spanish
- 1 - Animal Techniques Requirement²
- 3 - Humanities Requirement E.2¹
- 1 - Elective

17-18

Junior Year**First Semester**

- 3 - AVS 370 Principles of Animal Nutrition
- 4 - AN PH 301 Physiology and Anatomy of Domestic Animals
- 3 - AP EC 302 Econ. of Farm Management
- 3 - EX ST 301 Introductory Statistics
- 1 - Animal Techniques Requirement²
- 3 - Elective

Second Semester

- 2 - AVS 302 Principles of Livestock Selection
- 2 - AVS 309 Principles of Equine Evaluation
- 3 - AVS 375 Applied Animal Nutrition
- 2 - AVS 385 Equine Behavior and Training
- 3 - AVS 453 Animal Reproduction
- 3 - CSENV 423 Field Crop—Forages
- 3 - SPCH 250 Public Speaking

18

Senior Year**First Semester**

- 2 - AVS 406 Seminars and Related Topics
- 3 - AVS 407 Equine Theriogenology
- 4 - Animal Production Requirement³
- 3 - Business Requirement⁴
- 3 - Writing Intensive Requirement¹
- 2 - Elective

17

Second Semester

- 4 - AVS 412 Horse Production
- 3 - AVS 470 Animal Breeding
- 3 - MGT 307 Personnel Management
- 3 - Business Requirement⁴
- 4 - Elective⁵

17

134-138 Total Semester Hours

¹See General Education Requirements.²See advisor. Select from AVS 120, 203, or 210.³See advisor. Select from AVS 401, 402, 404, or 408.⁴See advisor. Select from AG M 205, 401, 402, 403, 460, AGRIC (EN SP) 315, AP EC 309, 319, 351, 409, 433, 460, CSENV (B E) 408, ECON 211, 212, EN SP 432, LAW 312, 313, MGT 301.⁵Electives may be taken in the first semester of the senior year if necessary.**FOOD ANIMAL BUSINESS OPTION****Sophomore Year****First Semester**

- 1 - AVS 210 Animal Science Techniques
- 3 - ACCT 201 Accounting Concepts I or 3 - ACCT 203 Financial Accounting
- 3 - AP EC 202 Agricultural Economics
- 4 - SPAN 101 Elementary Spanish
- 3 - Humanities Requirement E.1¹
- 3 - Computer Skills Requirement¹

17

Second Semester

- 3 - AVS 310 Animal Disease and Sanitation
- 4 - CSENV 202 Soils
- 3 - EX ST 301 Introductory Statistics
- 4 - SPAN 102 Elementary Spanish

1 - Animal Techniques Requirement²3 - Elective¹

18

Junior Year**First Semester**

- 3 - AVS 370 Principles of Animal Nutrition
- 4 - AN PH 301 Physiology and Anatomy of Domestic Animals
- 3 - AP EC 302 Econ. of Farm Management
- 3 - SPCH 250 Public Speaking
- 1 - Animal Techniques Requirement²
- 3 - Elective¹

17

Second Semester

- 2 - AVS 302 Principles of Livestock Selection
- 2 - AVS 353 Meats
- 1 - AVS 354 Meats Lab.
- 3 - AVS 375 Applied Animal Nutrition
- 3 - AVS 453 Animal Reproduction
- 3 - Writing Intensive Requirement¹
- 3 - Elective¹

17

Senior Year**First Semester**

- 2 - AVS 406 Seminars and Related Topics
- 4 - Animal Production Requirement⁴
- 6 - Business Requirement⁵
- 3 - Humanities Requirement E.2¹
- 3 - Elective¹

18

Second Semester

- 3 - AVS 470 Animal Breeding
- 3 - MGT 307 Personnel Management
- 4 - Animal Production Requirement⁴
- 3 - Business Requirement⁵
- 3 - Elective^{1,6}

16

134-137 Total Semester Hours

¹See General Education Requirements.²See advisor. Select from AVS 120, 203, or 204.³Students opting to use elective hours to pursue a minor should inform their advisors early in their academic careers.⁴See advisor. Select from AVS 401 or 408; and 402, 404, or 412.⁵See advisor. Select from AG M 205, 401, 402, 403, 460, AGRIC (EN SP) 315, AP EC 309, 319, 351, 409, 433, 460, CSENV (B E) 408, 423, ECON 211, 212, EN SP 432, LAW 312, 313, MGT 301.⁶Electives may be taken in the first semester of the senior year if necessary.**POULTRY BUSINESS OPTION****Sophomore Year****First Semester**

- 1 - AVS 120 Poultry Techniques
- 3 - ACCT 201 Accounting Concepts I or 3 - ACCT 203 Financial Accounting
- 3 - AP EC 202 Agricultural Economics
- 4 - SPAN 101 Elementary Spanish
- 3 - Humanities Requirement E.1¹
- 3 - Computer Skills Requirement¹

17

Second Semester

- 3 - AVS 310 Animal Disease and Sanitation
- 2 - AVS 323 Poultry and Poultry Products Eval.
- 3 - EX ST 301 Introductory Statistics
- 4 - SPAN 102 Elementary Spanish
- 1 - Animal Techniques Requirement²
- 3 - Humanities Requirement E.2¹
- 1 - Elective

17

Junior Year**First Semester**

- 3 - AVS 370 Principles of Animal Nutrition
- 2 - AVS 400 Avian Physiology³
- 4 - AN PH 301 Physiology and Anatomy of Domestic Animals
- 3 - AP EC 302 Econ. of Farm Management
- 3 - SPCH 250 Public Speaking
- 3 - Business Requirement⁴

18

Second Semester

- 2 - AVS 302 Principles of Livestock Selection
- 3 - AVS 355 Poul. Products Grading and Tech.⁵
- 3 - AVS 375 Applied Animal Nutrition
- 3 - AVS 453 Animal Reproduction
- 1 - Animal Techniques Requirement²
- 3 - Business Requirement⁴
- 3 - Elective

18

Senior Year**First Semester**

- 2 - AVS 406 Seminars and Related Topics
- 3 - AVS 458 Avian Microbiol. and Parasitology
- 4 - Animal Production Requirement⁶
- 3 - Business Requirement⁴
- 3 - Writing Intensive Requirement¹
- 1 - Elective

16

Second Semester

- 4 - AVS 402 Poultry Management
- 3 - MGT 307 Personnel Management
- 3 - Business Requirement⁴
- 7 - Elective⁷

17

134-137 Total Semester Hours

¹See General Education Requirements.²See advisor. Select from AVS 203, 204, or 210.³AVS 400 is taught in the fall semester of even-numbered years and may be taken in the senior year. See advisor for scheduling alternatives.⁴See advisor. Select from AG M 205, 401, 402, 403, 460, AGRIC (EN SP) 315, APEC 309, 319, 351, 409, 433, 460, CSENV (BE) 408, ECON 211, 212, EN SP 432, LAW 312, 313, MGT 301.⁵AVS 355 is taught in alternate years and may be taken in the senior year. See advisor for scheduling alternatives.⁶Select from AVS 401, 404, 408, 412. Some courses are taught on an alternate semester/year cycle. See advisor for scheduling alternatives.⁷Electives may be taken in the first semester of the senior year if necessary.**PREVETERINARY AND SCIENCE OPTION****Sophomore Year****First Semester**

- 3 - CH 223 Organic Chemistry
- 1 - CH 227 Organic Chemistry Lab.
- 4 - PHYS 207 General Physics I
- 1 - Animal Techniques Requirement¹
- 6 - Humanities Requirement E.1 and E.2²
- 3 - Elective³

18

Second Semester

- 3 - CH 224 Organic Chemistry
- 1 - CH 228 Organic Chemistry Lab.
- 3 - EX ST 301 Introductory Statistics
- 4 - PHYS 208 General Physics II
- 3 - Computer Skills Requirement²
- 3 - Social Science Requirement²

17

Junior Year**First Semester**

- 3 - AVS 370 Principles of Animal Nutrition
- 4 - AN PH 301 Physiology and Anatomy of Domestic Animals
- 3 - AP EC 202 Agricultural Economics
- 3 - BIOCH 301 General Biochemistry
- 4 - GEN 302 Introductory Genetics
- 1 - Animal Techniques Requirement¹

18

Second Semester

- 3 - AVS 310 Animal Disease and Sanitation
- 3 - AVS 375 Applied Animal Nutrition
- 3 - AVS 453 Animal Reproduction
- 4 - MICRO 305 General Microbiology
- 3 - SPCH 250 Public Speaking
- 1 - Animal Techniques Requirement¹

17

Senior Year**First Semester**

- 2 - AVS 406 Seminars and Related Topics
- 4 - Animal Production Requirement⁴
- 3-4 - Animal Products Requirement³
- 8 - Elective³

17-18

Second Semester

- 3 - AVS 470 Animal Breeding
- 3 - Writing Intensive Requirement²
- 10 - Elective^{3,6}

16

134-138 Total Semester Hours

¹See advisor. Select from AVS 120, 203, 204, or 210.²See General Education Requirements.³Students opting to use elective hours to pursue a minor should inform their advisors early in their academic careers.⁴Select from AVS 401, 402, 404, 408, 412. Some courses are taught on an alternate semester/year cycle. See advisor for scheduling alternatives. Tuskegee University Veterinary School requires three credits of poultry science.⁵See advisor. Select from AVS 353/354, 355, 430. Some courses are taught on an alternate semester/year cycle. See advisor for scheduling alternatives.⁶Electives may be taken in the first semester of the senior year if necessary.**AQUACULTURE, FISHERIES, AND WILDLIFE BIOLOGY****Bachelor of Science**

Increased interest in conservation of natural resources and the environment and demand for seafood products and farm-raised fish has resulted in these areas becoming increasingly technical and requiring highly qualified wildlife and fisheries biologists. Greatest demands for graduates are in the areas of management, research, survey and regulatory positions with state and federal agencies; industrial research and quality control laboratories; conservation, recreational, and other public service agencies; private enterprises and fish farms.

The undergraduate curriculum provides a solid foundation for many career opportunities in the sciences. The curriculum is strong in basic and applied sciences, communication skills, and the social sciences. Twenty-seven credit hours may be selected from emphasis areas and elective course offerings. Students select an emphasis area in either aquaculture and fisheries, wildlife management, or preveterinary medicine. These allow students to expand their knowledge of aquaculture, fisheries, and wildlife or to broaden their background with courses in botany, zoology, and other sciences. In addition, six semester credits are available for field training with appropriate natural resource agencies. Students can satisfy coursework requirements for professional certification by the Wildlife Society and/or the American Fisheries Society.

Freshman Year**First Semester**

- 4 - BIOL 103 General Biology I
- 4 - CH 101 General Chemistry
- 3 - ENGL 101 Composition I
- 3 - MTHSC 102 Intro. to Mathematical Analysis
- 1 - W F B 101 Introduction to Aquaculture, Fisheries, and Wildlife
- 1 - W F B 102 Methods of Aquaculture, Fisheries, and Wildlife Biology

16

Second Semester

- 4 - BIOL 104 General Biology II
- 4 - CH 102 General Chemistry
- 3 - ENGL 102 Composition II
- 3 - Mathematical Sciences Requirement¹
- 3 - Elective

17

Sophomore Year**First Semester**

- 4 - CH 201 Survey of Organic Chemistry or
- 3 - BIOCH 210 Elementary Biochemistry and
- 1 - BIOCH 211 Elem. Biochemistry Lab. or
- 3 - CH 223 Organic Chemistry and
- 1 - CH 227 Organic Chemistry Lab.
- 4 - CSENV 202 Soils
- 3 - W F B 350 Prin. of Fish and Wildlife Biology
- 3 - Bioscience Requirement²
- 3 - Elective

17

Second Semester

- 4 - PHYS 200 Introductory Physics¹
- 3 - Bioscience Requirement²
- 3 - Computer Skills Requirement¹
- 4 - Emphasis Area⁴
- 3 - Social Science Requirement¹

17

Junior Year**First Semester**

- 3 - AG M 301 Soil and Water Conservation
- 3 - ENGL 314 Technical Writing
- 3 - W FB (BIOSC) 313 Conservation Biology
- 4 - Emphasis Area⁴
- 3 - Humanities Requirement E.1¹
- 1 - Elective

17

Second Semester

- 4 - AN PH 301 Physiology and Anatomy of Domestic Animals
- 3 - EX ST 301 Introductory Statistics
- 4 - GEN 302 Introductory Genetics
- 3 - Social Science Requirement¹
- 3 - Wildlife and Fisheries Biology Requirement²

17

Senior Year**First Semester**

- 3 - SPCH 250 Public Speaking
- 3 - Ecology Requirement⁶
- 4 - Emphasis Area⁴
- 3 - Fisheries Requirement⁷
- 3 - Wildlife Requirement²
- 1 - Elective

17

Second Semester

- 1 - W FB 499 Wildlife Biology and Fisheries Seminar
- 7 - Emphasis Area⁴
- 3 - Fisheries Requirement⁷
- 3 - Humanities Requirement E.2¹
- 3 - Elective

17

135 Total Semester Hours¹See General Education Requirements.²Three credits from BIOSC 302 or 303; three credits from BIOSC 304 or 305.³Preventive Medicine students must substitute PHYS 207.⁴Nineteen credits from one of the three Emphasis Areas.⁵Aquaculture and Fisheries—Advisor approves courses selected from agricultural and applied economics, biological sciences, community and rural development, environmental science and policy, entomology, environmental toxicology, forestry, geology, microbiology, philosophy, wildlife and fisheries biology, and other courses.⁶Wildlife Biology—Advisor approves courses selected from agricultural and applied economics, biological sciences, community and rural development, environmental science and policy, entomology, environmental toxicology, forestry, geology, microbiology, philosophy, wildlife and fisheries biology, and other courses.⁷Preventive Medicine—AVS 202, BIOCH 301, 302, CH 224, 228, MICRO 305, NUTR 401, PHYS 208 or courses approved by advisor (see Preventive Medicine).⁸Six credits from W FB 412, 414, 430, 462.⁹Three credits from BIOSC 441, 443, 446.¹⁰Six credits from W FB 416, 450, 451.**BIOCHEMISTRY****Bachelor of Science**

Biochemistry is the study of the molecular basis of life. To comprehend current biochemical information and make future contributions to our molecular understanding of life processes, students must obtain a broad background in biology and a firm foundation in chemistry, mathematics, and physics. This is the basis of the biochemistry curriculum.

The program provides an excellent educational background for professional school (medicine, dentistry, or veterinary medicine) and graduate school in biochemistry, molecular biology, or another biological science discipline. The graduate will find employment opportunities in the research and service programs of universities, medical schools, hospitals, research institutes, and industrial and government laboratories.

Freshman Year**First Semester**

- 5 - BIOL 110 Principles of Biology I
- 4 - CH 101 General Chemistry
- 3 - ENGL 101 Composition I
- 4 - MTHSC 106 Calculus of One Variable I

16

Second Semester

- 5 - BIOL 111 Principles of Biology II
- 4 - CH 102 General Chemistry
- 3 - ENGL 102 Composition II
- 4 - MTHSC 108 Calculus of One Variable II

16

Sophomore Year**First Semester**

- 3 - CH 223 Organic Chemistry
- 1 - CH 227 Organic Chemistry Lab.¹
- 4 - MICRO 305 General Microbiology
- 4 - MTHSC 206 Calculus of Several Variables
- 3 - PHYS 122 Physics with Calculus I
- 1 - PHYS 124 Physics Lab. I

16

Second Semester

- 3 - BIOCH 301 General Biochemistry
- 3 - CH 224 Organic Chemistry
- 1 - CH 228 Organic Chemistry Lab.¹
- 3 - PHYS 221 Physics with Calculus II
- 1 - PHYS 223 Physics Lab. II
- 3 - Literature Requirement²
- 3 - Social Science Requirement¹

17

Junior Year**First Semester**

- 3 - BIOCH 431 Physical Approach to Biochem.
- 2 - BIOCH 433 General Biochemistry Lab. I
- 3 - CH 330 Introduction to Physical Chemistry³
- 3 - CP SC 120 Issues in Computers
- 3 - Science Requirement⁴
- 3 - Elective

17

Second Semester

- 3 - BIOCH 432 Biochemistry of Metabolism
- 2 - BIOCH 434 General Biochemistry Lab. II
- 2 - BIOCH 436 Nucleic Acid and Protein Biosyn.
- 3 - Literature Requirement²
- 4 - Science Requirement¹
- 3 - Social Science Requirement¹

17

Senior Year**First Semester**

- 3 - BIOCH 431 Special Problems in Biochemistry
- 3 - CH 313 Quantitative Analysis
- 1 - CH 317 Quantitative Analysis Lab.
- 3 - SPCH 250 Public Speaking
- 3 - Approved Requirement⁶
- 3 - Elective

16

Second Semester

- 2 - BIOSC 493 Senior Seminar
- 3 - ENGL 314 Technical Writing
- 6 - Approved Requirement⁶
- 4 - Elective

15

130 Total Semester Hours¹CH 225 may be substituted for CH 227, and CH 226 may substitute for CH 228. In both cases, the additional hour of credit counts toward a science requirement.²ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.³See General Education Requirements.⁴CH 331 may be substituted.⁵Selected from biological sciences, chemistry, computer science, genetics, mathematics, microbiology, physics, plant pathology, or as approved by the advisor in consultation with the biochemistry faculty.⁶Selected from the humanities and/or social sciences (sections E.2 and F of the General Education Requirements). A one-year sequence in a foreign language is strongly recommended.**BIOLOGICAL SCIENCES****Bachelor of Science**

Biology encompasses the broad spectrum of the modern life sciences, including the study of all aspects of life from the structure and function of the whole organism down to the subcellular levels and up through the interactions of organisms to the integrated existence of life on the entire planet. Descriptive, structural, functional, and evolutionary questions are explored through the hierarchy of the organization of life. Applications of current advances to the health and well-being of man and his society, to nature and the continuation of earth as a balanced ecosystem, and to an appreciation of the place of natural science in our cultural heritage receive emphasis.

Majors in Biological Sciences receive classroom, laboratory, and field training in biology with an emphasis on chemistry, mathematics, and physics as necessary tools. The Bachelor of Science in Biological Sciences curriculum prepares students for graduate study in any of the life science areas (such as agricultural sciences, biochemistry, botany, cell and molecular biology, conservation, ecology and environmental science, entomology, forestry, genetics, industrial and regulatory biology, microbiology, morphology, physiology, wildlife biology, and zoology, among others), for the health professions (medicine, dentistry, etc.), veterinary medicine, and for science teaching.

Freshman Year**First Semester**

- 5 - BIOL 110 Principles of Biology I¹
- 1 - BIOSC 101 Frontiers in Biology I²
- 4 - CH 101 General Chemistry
- 3 - ENGL 101 Composition I
- 4 - MTHSC 106 Calculus of One Variable I

17

Second Semester

- 5 - BIOL 111 Principles of Biology II¹
- 1 - BIOSC 102 Frontiers in Biology II²
- 4 - CH 102 General Chemistry
- 3 - ENGL 102 Composition II
- 4 - MTHSC 108 Calculus of One Variable II

17

Sophomore Year**First Semester**

- 3 - CH 223 Organic Chemistry
- 1 - CH 227 Organic Chemistry Lab.
- 3 - CP SC 120 Issues in Computers
- 4 - GEN 302 Genetics
- 3 - Literature Requirement³
- 3 - Elective

17

Second Semester

- 3 - BIOCH 301 General Biochemistry
- 1 - BIOCH 302 Molecular Biology Lab.⁴
- 3 - BIOSC 335 Evolutionary Biology
- 3 - CH 224 Organic Chemistry
- 3 - PHIL 325 Philosophy of Science or
3 - PHIL 326 Science and Values
- 3 - Social Science Requirement⁵

16

Junior Year**First Semester**

- 3 - ENGL 314 Technical Writing
- 4 - PHYS 207 General Physics I or
3 - PHYS 122 Physics with Calculus I and
1 - PHYS 124 Physics Lab. I⁶
- 7 - Major⁷
- 3 - Social Science Requirement⁵

17

Second Semester

- 4 - PHYS 208 General Physics II or
3 - PHYS 221 Physics with Calculus II and
1 - PHYS 223 Physics Lab. II
- 3 - SPCH 250 Public Speaking
- 7 - Major⁷
- 3 - Elective

17

Senior Year**First Semester**

- 2 - BIOSC 493 Senior Seminar
- 12 - Major⁷
- 3 - Elective

17

Second Semester

- 11 - Major⁷
- 6 - Elective

17

135 Total Semester Hours

¹BIOL 110 and 111 are strongly recommended; however, BIOL 103 may substitute for BIOL 110, and BIOL 104 may substitute for BIOL 111. The remaining 1-2 hours required must be satisfied by completing 1-2 extra hours in major courses.

²If not completed during the freshman year, required 1-2 credits must be satisfied by completing 1-2 extra hours in major courses.

³Select from sophomore literature courses (200-level only) or foreign language literature (300-level or higher).

⁴CH 228 may be substituted for BIOCH 302.

⁵See General Education Requirements.

⁶Physics with calculus is a three-semester sequence. Students selecting this option may wish to take PHYS 222/224 in the senior year to complete the sequence.

⁷See advisor. At least one lecture course must be taken from each of the following designated course areas: (1) Ecology, (2) Cell Biology, (3) Physiology, (4) Animal Diversity, and (5) Plant Diversity. Laboratories must be included with the Animal or Plant Diversity courses selected. An additional six credits of lab are required and must include a lab from each of two of the three remaining core areas (Ecology, Cell Biology, and Physiology) to match the major core lecture course taken. The remaining courses may be selected from the departmental course offerings at the 300 level or above.

BIOLOGICAL SCIENCES**Bachelor of Arts**

The Bachelor of Arts in Biological Sciences provides a strong foundation in biology and is ideal for students desiring a liberal education emphasizing an interdisciplinary approach to a thorough understanding of the life sciences.

Freshman Year**First Semester**

- 5 - BIOL 110 Principles of Biology I¹
- 1 - BIOSC 101 Frontiers in Biology I²
- 4 - CH 101 General Chemistry
- 3 - ENGL 101 Composition I
- 4 - Foreign Language Requirement³

17

Second Semester

- 5 - BIOL 111 Principles of Biology II¹
- 1 - BIOSC 102 Frontiers in Biology II²
- 4 - CH 102 General Chemistry
- 3 - ENGL 102 Composition II
- 4 - Foreign Language Requirement³

17

Sophomore Year**First Semester**

- 4 - GEN 302 Introductory Genetics
- 3 - HIST 172 Western Civilization
- 4 - MTHSC 106 Calculus of One Variable I
- 3 - Foreign Language Requirement³
- 3 - Literature Requirement⁴

17

Second Semester

- 3 - BIOSC 335 Evolutionary Biology
- 3 - CP SC 120 Issues in Computers
- 4 - MTHSC 108 Calculus of One Variable II or
3 - MTHSC 301 Stat. Theory and Meth. I
- 3 - Foreign Language Requirement³
- 3 - Literature Requirement⁴

16-15

Junior Year**First Semester**

- 3 - BIOCH 210 Elementary Biochemistry
- 1 - BIOCH 211 Elementary Biochemistry Lab.
- 3 - ENGL 314 Technical Writing
- 4 - PHYS 207 General Physics I
- 4 - Major⁵
- 3 - Minor⁶

18

Second Semester

- 3 - HIST 173 Western Civilization
- 3 - PHIL 325 Philosophy of Science or
3 - PHIL 326 Science and Values
- 4 - PHYS 208 General Physics II
- 3 - SPCH 250 Public Speaking
- 4 - Major⁵

17

Senior Year**First Semester**

- 2 - BIOSC 493 Senior Seminar
- 3 - Major⁵
- 6 - Minor⁶
- 5-6 - Elective

16-17

Second Semester

- 6 - Major⁵
- 6 - Minor⁶
- 4 - Elective

16

134 Total Semester Hours

¹BIOL 110 and 111 are strongly recommended; however, BIOL 103 may substitute for BIOL 110, and BIOL 104 may substitute for BIOL 111. The remaining 1-2 hours required must be satisfied by completing 1-2 extra hours in major courses.

²If not completed during the freshman year, required 1-2 credits must be satisfied by completing 1-2 extra credits in major courses.

³Four semesters of the same language are required.

⁴To be selected from sophomore literature courses (200-level only) or foreign language literature (300-level or higher).

⁵At least one lecture course must be taken from each of five designated course areas: (1) Ecology, (2) Cell Biology, (3) Physiology, (4) Animal Diversity, and (5) Plant Diversity. Laboratories must be taken with the Animal and Plant Diversity courses selected.

⁶Minors may be arranged in consultation with a departmental advisor.

**BIOSYSTEMS
ENGINEERING****Bachelor of Science**

The Biosystems Engineering program is administered jointly by the College of Agriculture, Forestry, and Life Sciences and the College of Engineering and Science. See page 74 for the curriculum.

CROP AND SOIL ENVIRONMENTAL SCIENCE

Bachelor of Science

Crop and soil environmental science is the branch of agriculture that deals with the theory and practice of field-crop production and soil management. It involves the application of basic sciences such as botany, biochemistry, chemistry, genetics, mathematics, microbiology, and physics to food and fiber production and to solving environmental problems. On the agricultural side, agronomic crops account for the bulk of the primary food production for the world's population. Career opportunities for Crop and Soil Environmental Science majors exist in biotechnology, environmental sciences, international agriculture, the dynamic high-tech world of agriculture as well as in traditional agriculture.

The degree in Crop and Soil Environmental Science can be tailored to a job in industry, government, or business, depending on the student's career objectives. The degree can also be a stepping stone to graduate school and a career in research. Because the Crop and Soil Environmental Science curriculum is a combination of basic and applied sciences, it provides flexibility and marketability.

Students majoring in Crop and Soil Environmental Science will select from four study areas: Agronomic Systems, Environmental Agronomy, Soil and Environment, and Weed Science.

AGRONOMIC SYSTEMS STUDY AREA

This study area provides a comprehensive agronomy curriculum which can prepare students for careers in crop consulting, extension education, farm management, and industries requiring a knowledge of agricultural or managed ecosystems. It will also prepare students for graduate work in crop-related areas such as crop physiology, plant breeding and genetics, crop management, plant-soil-environment relationships, and soil fertility.

Freshman Year

First Semester

- 3 - AGRIC 103 Intro. to Animal Industries
- 4 - CH 101 General Chemistry
- 1 - CSENV 100 Introduction to CSENV
- 3 - ENGL 101 Composition I
- 3 - MTHSC 102 Intro. to Math. Analysis or
- 4 - MTHSC 106 Calculus of One Variable I
- 3 - Social Science Requirement¹

17-18

Second Semester

- 3 - AGRIC 104 Introduction to Plant Sciences
- 3 - AP EC 202 Agricultural Economics
- 4 - CH 102 General Chemistry
- 3 - ENGL 102 Composition II
- 3 - EX ST 301 Introductory Statistics or
- 4 - MTHSC 108 Calculus of One Var. II or
- 3 - MTHSC 207 Multivariable Calculus

16-17

Sophomore Year

First Semester

- 4 - BIOL 103 General Biology I
- 3 - CH 223 Organic Chemistry and
- 1 - CH 227 Organic Chemistry Lab. or
- 3 - BIOCH 210 Elem. Biochemistry and
- 1 - BIOCH 211 Elem. Biochemistry Lab.
- 4 - CSENV 202 Soils
- 3 - Literature Requirement²
- 3 - Elective

18

Second Semester

- 3 - BIOSC 205 Plant Form and Function
- 1 - BIOSC 206 Plant Form and Function Lab.
- 4 - PHYS 200 Introductory Physics
- 3 - Computer Skills Requirement¹
- 3 - Humanities Requirement E.2¹
- 3 - Elective

17

Junior Year

First Semester

- 3 - BIOSC 401 Plant Physiology
- 1 - BIOSC 402 Plant Physiology Lab.
- 3 - CSENV (AP EC) 426 Crop. Syst. Analysis
- 4 - GEN 302 Introductory Genetics
- 3 - Crop Production Requirement³
- 3 - Pest Management Requirement⁴

17

Second Semester

- 3 - EN SP 200 Intro. to Environmental Science⁵
- 3 - SPCH 250 Public Speaking
- 6 - Agronomy Requirement⁶
- 3 - Crop Production Requirement³
- 3 - Pest Management Requirement⁴

18

Senior Year

First Semester

- 1 - CSENV 455 Seminar
- 3 - ENGL 312 Advanced Expository Writing or
- 3 - ENGL 314 Technical Writing
- 3 - Agronomic Specialty Requirement⁷
- 5 - Agronomy Requirement⁶
- 4 - Elective

16

Second Semester

- 3 - CSENV 452 Soil Fertility Management
- 3 - Agronomic Specialty Requirement⁷
- 3 - Agronomy Requirement⁶
- 6 - Elective

15

134-136 Total Semester Hours

¹See General Education Requirements.²ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.³Select at least two of the following: CSENV 421, 422, 423.⁴Select at least two of the following: CSENV 407, ENT 301, PL PA 401.⁵BIOSC 441 may be substituted.⁶Select at least 14 credits from the following: CSENV 403, 405, 407, 421, 422, 423, 425, (HORT) 433, 446, 453, 475, 490, ENT 301, PL PA 401, and no more than three credits from CSENV 350 or 406.⁷Select at least two of the following: CSENV 405, 425, 490.

ENVIRONMENTAL

AGRONOMY STUDY AREA

Students seeking careers in agriculture, natural resources management, and environmental improvement should consider the Environmental Agronomy study area. Because knowledge of crop and soil science is vital to solving many environmental problems in modern society, this study area provides a strong background in agronomy-related subjects and also includes courses in environmental science, policy, and law. Additional coursework in environmental areas will be provided by technical area courses tailored for each student.

Freshman Year

First Semester

- 3 - AP EC 202 Agricultural Economics
- 4 - CH 101 General Chemistry
- 1 - CSENV 100 Introduction to CSENV
- 3 - ENGL 101 Composition I
- 3 - MTHSC 102 Intro. to Math. Analysis or
- 4 - MTHSC 106 Calculus of One Variable I
- 2 - Elective

16-17

Second Semester

- 3 - AGRIC 104 Introduction to Plant Sciences
- 4 - CH 102 General Chemistry
- 3 - ENGL 102 Composition II
- 3 - MTHSC 207 Multivariable Calculus or
- 4 - MTHSC 108 Calculus of One Variable II
- 3 - Social Science Requirement¹

16-17

Sophomore Year

First Semester

- 4 - BIOL 103 General Biology I
- 3 - CH 223 Organic Chemistry and
- 1 - CH 227 Organic Chemistry Lab. or
- 4 - CH 201 Survey of Organic Chemistry
- 4 - CSENV 202 Soils
- 3 - Humanities Requirement E.1¹

15

Second Semester

- 4 - BIOL 104 General Biology II or
- 3 - BIOSC 205 Plant Form and Function and
- 1 - BIOSC 206 Plant Form and Function Lab.
- 3 - CH 224 Organic Chemistry and
- 1 - CH 228 Organic Chemistry Lab. or
- 3 - BIOCH 210 Elem. Biochemistry and
- 1 - BIOCH 211 Elem. Biochemistry Lab.
- 4 - PHYS 200 Introductory Physics
- 3 - Computer Skills Requirement¹
- 2-3 - Soils Requirement²

17-18

Junior Year

First Semester

- 3 - CSENV 407 Weed Ecology and Management
- 3 - CSENV 421 Prin. of Field Crop Production
- 3 - EN SP 200 Intro. to Environmental Science
- 3 - EX ST 301 Introductory Statistics
- 4 - GEN 302 Introductory Genetics

16

Second Semester

- 3 - BIOSC 401 Plant Physiology and
- 1 - BIOSC 402 Plant Physiology Lab.
- 3 - CSENV 422 Major World Crops or
- 3 - CSENV 423 Field Crop—Forages
- 3 - CSENV 452 Soil Fertility and Management
- 3 - ENGL 312 Advanced Expository Writing or
- 3 - ENGL 314 Technical Writing
- 3 - Technical Area Requirement⁴

16

Senior Year**First Semester**

- 3 - CSENV (AP EC) 426 Crop. Syst. Analysis
- 1 - CSENV 455 Seminar
- 3 - Humanities Requirement E.2¹
- 3 - Oral Communication Requirement¹
- 3 - Technical Area Requirement⁴
- 4 - Elective

17

Second Semester

- 3 - AP EC 433 Agricultural Law and Related Environmental Issues
- 3 - CSENV (B E) 408 Land Treat. of Wastewater
- 3 - EN SP 400 Studies in Environmental Science
- 3 - Technical Area Requirement⁴
- 4 - Elective

16

129-132 Total Semester Hours

¹See General Education Requirements.²CSENV 403, 446, 475, 490.³Technical area courses will be selected from a list maintained in the department; see advisor.**SOIL AND ENVIRONMENT STUDY AREA**

This study area develops an understanding of soil as a natural resource and a component of all terrestrial ecosystems. Students learn how soils influence ecological processes above and below ground. Understanding processes enables students to deal with traditional agricultural production issues as well as environmental management problems such as ground-water protection and the most appropriate use for a particular landscape. Students can aim toward a variety of special areas including soil biology, fertility, chemistry, physics, mineralogy, and morphology.

Freshman Year**First Semester**

- 4 - BIOL 103 General Biology I
- 4 - CH 101 General Chemistry
- 1 - CSENV 100 Introduction to CSENV
- 3 - ENGL 101 Composition I
- 3 - MTHSC 102 Intro. to Math. Analysis or
- 4 - MTHSC 106 Calculus of One Variable I

15-16

Second Semester

- 3 - AGRIC 104 Introduction to Plant Sciences
- 4 - BIOL 104 General Biology II
- 4 - CH 102 General Chemistry
- 3 - ENGL 102 Composition II
- 3 - MTHSC 207 Multivariable Calculus or
- 4 - MTHSC 108 Calculus of One Variable II

17-18

Sophomore Year**First Semester**

- 3 - CH 223 Organic Chemistry¹
- 1 - CH 227 Organic Chemistry Lab.
- 3 - GEOL 101 Physical Geology
- 1 - GEOL 103 Physical Geology Lab.
- 4 - PHYS 207 General Physics²
- 3 - Humanities Requirement E.2³
- 3 - Social Science Requirement⁴

18

Second Semester

- 3 - CH 224 Organic Chemistry⁵
- 1 - CH 228 Organic Chemistry Lab.
- 4 - CSENV 202 Soils
- 3 - EN SP 200 Intro. to Environmental Science
- 4 - PHYS 208 General Physics⁵
- 3 - Literature Requirement⁷

18

Junior Year**First Semester**

- 3 - CH 313 Quantitative Analysis
- 2 - CH 315 Quantitative Analysis Lab.
- 3 - SPCH 250 Public Speaking
- 3 - Agronomy Crops Option⁸
- 3 - Computer Skills Requirement³
- 3 - Environmental Science Option⁹

17

Second Semester

- 3 - CSENV 452 Soil Fertility and Management
- 1 - CSENV 453 Soil Fertility Lab.
- 3 - CSENV 475 Soil Physics and Chemistry
- 3 - ENGL 312 Advanced Expository Writing or
- 3 - ENGL 314 Technical Writing
- 4 - MICRO 305 General Microbiology
- 3 - Environmental Science Option⁹

17

Senior Year**First Semester**

- 2 - CSENV 403 Soil Genesis and Classification
- 1 - CSENV 455 Seminar
- 3 - CSENV 490 Beneficial Soil Organisms in Plant Growth
- 3 - Environmental Science Option⁹
- 6 - Elective

15

Second Semester

- 3 - BIOSC 401 Plant Physiology and
- 1 - BIOSC 402 Plant Physiology Lab. or
- 4 - GEN 302 Introductory Genetics
- 3 - CSENV 408 Land Treatment of Wastewater
- 3 - EN SP 400 Studies in Environmental Science
- 3 - Social Science Requirement⁴
- 4 - Elective

17

134-136 Total Semester Hours

¹CH 201 may be substituted.²PHYS 122/124 may be substituted.³See General Education Requirements.⁴See General Education Requirements; must include three credits of agricultural and applied economics or economics.⁵BIOCH 210/211 may be substituted.⁶PHYS 221/223 may be substituted.⁷ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.⁸CSENV 421, 422, 423, 426.⁹See advisor.**WEED SCIENCE STUDY AREA**

This study area is designed for those who have special interest in the agricultural chemical industry, in consulting where weed control is to be the area of specialization, and in research and extension education. Courses include plant physiology, plant pathology, entomology, and pesticide toxicology and provide a broad education in pest control.

Students interested in graduate work can plan for specialization in such areas as weed physiology, ecology, and control or herbicide technology.

Freshman Year**First Semester**

- 3 - AGRIC 103 Intro. to Animal Industries
- 4 - CH 101 General Chemistry
- 1 - CSENV 100 Introduction to CSENV
- 3 - ENGL 101 Composition I
- 3 - MTHSC 102 Intro. to Math. Analysis or
- 4 - MTHSC 106 Calculus of One Variable I
- 3 - Social Science Requirement¹

17-18

Second Semester

- 3 - AGRIC 104 Introduction to Plant Sciences
- 3 - AP EC 202 Agricultural Economics
- 4 - CH 102 General Chemistry
- 3 - ENGL 102 Composition II
- 3 - EX ST 301 Introductory Statistics or
- 4 - MTHSC 108 Calculus of One Var. II or
- 3 - MTHSC 207 Multivariable Calculus

16-17

Sophomore Year**First Semester**

- 4 - BIOL 103 General Biology I
- 3 - CH 223 Organic Chemistry and
- 1 - CH 227 Organic Chemistry Lab. or
- 3 - BIOCH 210 Elementary Biochemistry and
- 1 - BIOCH 211 Elementary Biochem. Lab.
- 4 - CSENV 202 Soils
- 3 - Literature Requirement²
- 3 - Elective

18

Second Semester

- 3 - BIOSC 205 Plant Form and Function
- 1 - BIOSC 206 Plant Form and Function Lab.
- 4 - PHYS 200 Introductory Physics
- 3 - Computer Skills Requirement¹
- 3 - Humanities Requirement E.2¹
- 3 - Elective

17

Junior Year**First Semester**

- 3 - BIOSC 406 Introductory Plant Taxonomy
- 1 - BIOSC 407 Introductory Plant Taxon. Lab.
- 3 - CSENV 421 Prin. of Field Crop Production
- 3 - EN SP 200 Intro. to Environmental Science³
- 4 - GEN 302 Introductory Genetics
- 3 - SPCH 250 Public Speaking

17

Second Semester

- 3 - CSENV 422 Major World Crops
- 3 - CSENV 452 Soil Fertility and Management
- 3 - CSENV 490 Beneficial Soil Organisms in Plant Growth
- 4 - ENT 301 General Entomology
- 3 - PL PA 401 Plant Pathology
- 3 - Agronomy Requirement¹

19

Senior Year**First Semester**

- 3 - BIOSC 401 Plant Physiology
- 1 - BIOSC 402 Plant Physiology Lab.
- 3 - CSENV 407 Weed Ecology and Management
- 3 - CSENV (AP EC) 426 Crop. Syst. Analysis
- 3 - CSENV 446 Soil Management
- 1 - CSENV 455 Seminar
- 2 - Elective

16

Second Semester

- 3 - CSENV (HORT) 433 Integrated Weed Mgt.
- 3 - ENGL 312 Advanced Expository Writing or
- 3 - ENGL 314 Technical Writing
- 3 - ENT 420 Toxicology of Insecticides
- 3 - Agronomy Requirement¹
- 3 - Elective

15

135-137 Total Semester Hours

¹See General Education Requirements.²ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.³BIOSC 441 may be substituted.⁴CSENV 423, HORT 352, 412, 456.**ENTOMOLOGY****Bachelor of Science**

Entomology is the study of insects. Emphasis areas in the entomology major prepare students for exciting careers in areas such as arthropod biodiversity research, biotechnology and genetics, ecological risk assessment, landscape plants and turfgrass entomology, medical and veterinary entomology, natural resource conservation, pest management, and urban entomology. Entomology is a pre-veterinary curriculum and also provides an excellent foundation for graduate studies.

Emphasis areas include the following:

- Insect Science
- Urban Entomology
- Insect Biotechnology
- Insect Pest Management
- Environmental Entomology
- Landscape Plants and Turfgrass Entomology

Faculty with teaching, research, or Extension experience in the emphasis areas serve as mentors to students in those areas. The curriculum provides 21 credits that a student, in conjunction with the mentor, can select to tailor the undergraduate program to meet specific interests.

Entomologists are employed in areas as diverse as agriculture, biotechnology, environmental resources, forensics, genetics, health, industry, manufacturing, teaching, and urban and landscape surroundings. There are over one million known species of insects inhabiting every habitat on earth.

This diversity results in entomologists working from the Arctic and Antarctic to the tropics, from streams to deserts, and from oceans to mountain tops. Entomologists contribute directly to the health and well-being of both people and the environment.

Freshman Year**First Semester**

- 5 - BIOL 110 Principles of Biology I
- 4 - CH 101 General Chemistry
- 3 - ENGL 101 Composition I
- 1 - ENT 201 Current Topics in Entomology
- 3 - MTHSC 102 Intro. to Math. Analysis or
- 4 - MTHSC 106 Calculus of One Variable I¹

16-17

Second Semester

- 5 - BIOL 111 Principles of Biology II
- 4 - CH 102 General Chemistry
- 3 - ENGL 102 Composition II
- 1 - ENT 201 Current Topics in Entomology
- 3 - MTHSC 207 Multivariable Calculus or
- 4 - MTHSC 108 Calculus of One Variable II

16-17

Sophomore Year**First Semester**

- 3 - CH 223 Organic Chemistry
- 1 - CH 227 Organic Chemistry Lab.
- 4 - ENT 301 General Entomology
- 3 - Computer Skills Requirement²
- 4 - Foreign Language Requirement³
- 4 - Elective

19

Second Semester

- 3 - CH 224 Organic Chemistry
- 1 - CH 228 Organic Chemistry Lab.
- 4 - GEN 302 Introductory Genetics
- 4 - PHYS 200 Introductory Physics⁴
- 3 - Entomology Requirement⁵
- 4 - Foreign Language Requirement³

19

Junior Year**First Semester**

- 3 - ENT 305 Presentation of Scientific Info.
- 4 - ENT 405 Insect Morphology
- 3 - EX ST 301 Introductory Statistics or
- 3 - ACCT 201 Accounting Concepts
- 3 - Emphasis Area⁶
- 3 - Social Science Requirement²

16

Second Semester

- 3 - BIOSC 475 Comparative Physiology
- 3 - ENT 410 Insect Taxonomy
- 4 - MICRO 305 General Microbiology
- 3 - Emphasis Area⁶
- 3 - Writing Intensive Requirement²

16

Senior Year**First Semester**

- 3 - BIOSC 441 Ecology
- 2 - BIOSC 445 Ecology Lab.
- 1 - ENT 461 Directed Research in Entomology
- 3 - Emphasis Area⁶
- 3 - Entomology Requirement⁵

3 - Humanities Requirement E.1²

3 - Elective

18

Second Semester

- 1 - ENT 462 Seminar
- 6 - Emphasis Area⁶
- 3 - Humanities Requirement E.2²
- 3 - Social Science Requirement²
- 4 - Elective

17

137-139 Total Semester Hours

¹Students who fail to make a satisfactory score on the Mathematics Achievement Test, Level II must schedule either MTHSC 104 or 105 in consultation with their advisors.

²See General Education Requirements.

³Two semesters of the same foreign language are required.

⁴Pre-veterinary students and students interested in the Insect Biotechnology Emphasis Area must substitute PHYS 207 and take PHYS 208 as an Emphasis Area course.

⁵Students must select from 300-level or higher ENT courses in conjunction with the Emphasis Area advisor.

⁶Students are encouraged to select an emphasis area by the second semester of their sophomore year in consultation with the departmental advisor. Emphasis areas are Insect Science, Environmental Entomology, Urban Entomology, Landscape Plants and Turfgrass Entomology, Insect Biotechnology, and Insect Pest Management. Students not selecting a specific emphasis area will be advised in Insect Science. Specific courses in support of each emphasis area must be selected from department-approved lists in conjunction with the emphasis area advisor.

FOOD SCIENCE**Bachelor of Science**

Food Science majors apply principles of basic and applied sciences to the production, processing, evaluation, packaging, distribution, and utilization of safe, nutritious, and enjoyable foods and food products. The safety of foods during processing and preservation, the provision of foods with adequate nutritional value, adherence to dietary recommendations, and the conservation of resources are important consumer issues addressed by food scientists.

The curriculum allows flexibility for concentrating in one of two study areas. In the Food Science and Technology study area, students may emphasize business, engineering, food packaging, additional sciences, or other areas that complement requirements of the Institute of Food Technologists. Students choosing the Nutrition and Dietetics study area emphasize courses in nutrition and related areas within an approved didactic program in dietetics of the American Dietetic Association.

Food processing industries, ingredient manufacturers, and packaging supplier companies employ graduates in food product development, quality assurance, production, management, and business and technical sales. State and federal agencies also need graduates for food safety and regulatory positions. With Nutrition and Dietetics emphasis, employment opportunities include dietitians, nutritionists, consultants, and food specialists. Students are also well prepared to pursue graduate study in many areas on completion of the Food Science curriculum.

Freshman Year**First Semester**

- 4 - BIOL 103 General Biology I or
 - 5 - BIOL 110 Principles of Biology I
- 4 - CH 101 General Chemistry
- 3 - ENGL 101 Composition I
- 1 - FD SC 101 Epochs in Man's Struggle for Food
- 4 - Mathematical Sciences Requirement¹

16-17

Second Semester

- 4 - BIOL 104 General Biology II or
 - 5 - BIOL 111 Principles of Biology II
- 4 - CH 102 General Chemistry
- 3 - CP SC 120 Issues in Computers
- 3 - ENGL 102 Composition II
- 2 - FD SC 102 Perspectives in Food and Nutr. Sci.

16-17

Sophomore Year**First Semester**

- 3 - BIOCH 210 Elementary Biochemistry
- 1 - BIOCH 211 Elementary Biochemistry Lab.
- 4 - CH 201 Survey of Organic Chemistry or
 - 3 - CH 223 Organic Chemistry and
 - 1 - CH 227 Organic Chemistry Lab.
- 4 - PHYS 200 Introductory Physics or
 - 3 - PHYS 122 Physics with Calculus I or
 - 4 - PHYS 207 General Physics I
- 3 - Social Science Requirement²
- 2 - Elective

16-17

Second Semester

- 4 - FD SC 214 Food Resources and Preservation
- 3 - Humanities Requirement E.1³
- 3 - Oral Communication Requirement³
- 3 - Social Science Requirement²
- 3 - Elective

16

FOOD SCIENCE AND TECHNOLOGY STUDY AREA**Junior Year****First Semester**

- 3 - FD SC 404 Food Preservation and Processing
- 1 - FD SC 406 Food Preservation and Proc. Lab. I
- 4 - MICRO 305 General Microbiology
- 3 - NUTR 451 Human Nutrition
- 3 - Emphasis Area⁴
- 3 - Elective

17

Second Semester

- 3 - EX ST 301 Introductory Statistics
- 4 - FD SC 408 Food Process Engineering
- 4 - MICRO 407 Food and Dairy Microbiology
- 3 - Writing Intensive Requirement¹
- 2 - Elective

16

Senior Year**First Semester**

- 4 - FD SC 401 Food Chemistry I
- 3 - FD SC 409 TQM for the Food and Pkg. Ind.
- 1 - FD SC 417 Seminar

5 - Emphasis Area⁴

2 - Elective

15

Second Semester

- 4 - FD SC 402 Food Chemistry II
- 1 - FD SC 418 Seminar
- 4 - Department Requirement³
- 3 - Humanities Requirement E.2³
- 4 - Emphasis Area⁴

16

128-131 Total Semester Hours

NUTRITION AND DIETETIC STUDY AREA**Junior Year****First Semester**

- 4 - BIOSC 222 Human Anatomy and Phys. I
- 3 - FD SC 306 Food Service Operations
- 3 - FD SC 404 Food Preservation and Processing
- 2 - FD SC 407 Quantity Food Production
- 3 - NUTR 451 Human Nutrition
- 3 - Humanities Requirement E.2³

18

Second Semester

- 4 - BIOSC 223 Human Anatomy and Phys. II
- 3 - EX ST 301 Introductory Statistics
- 3 - NUTR 455 Nutrition and Metabolism
- 3 - Writing Intensive Requirement²
- 3 - Elective

16

Senior Year**First Semester**

- 4 - FD SC 401 Food Chemistry I
- 3 - FD SC 409 TQM for the Food and Pkg. Ind.
- 4 - MICRO 305 General Microbiology
- 4 - NUTR 425 Nutrition and Dietetics
- 3 - Registration Eligibility Requirement⁶

18

Second Semester

- 4 - FD SC 402 Food Chemistry II
- 4 - MICRO 407 Food and Dairy Microbiology
- 3 - NUTR 426 Community Nutrition
- 3 - Registration Eligibility Requirement⁶
- 2 - Elective

16

132-135 Total Semester Hours

¹MTHSC 106 or equivalent.²See General Education Requirements.³SPCH 250 or equivalent.⁴See departmental advisor for emphasis areas and course requirements.⁵FD SC 421, 491, PKGSC 464, 466.⁶See advisor for registration eligibility requirements of courses to meet additional competencies of the American Dietetic Association; students not pursuing registration eligibility will have slightly different course options.**FOREST PRODUCTS****Bachelor of Science**

The Forest Products curriculum combines a broad education in the sciences and humanities. Professional courses emphasize the properties and use of wood. Graduates are employed by wood-using industries and their suppliers, research laboratories, trade associations, and state and federal organizations.

The core curriculum allows for three areas of specialization: Wood Science, Wood Industries Management, and Forest Management. Wood Science deals with the properties and processing of wood, wood fiber, and products derived from wood. Wood Industries Management prepares students for the managerial aspects of forest products industries, including marketing and technical services. Emphasis areas can be explored in more depth through use of the remaining elective credits.

Completion of the curriculum leads to a Bachelor of Science degree in Forest Products. Graduate studies leading to the Master of Science, Master of Forest Resources, and Doctor of Philosophy degrees are also offered. At this time no new students are being enrolled in the Forest Products major; however, students interested in this field are encouraged to enroll in the Forest Products minor.

Freshman Year**First Semester**

- 4 - BIOL 103 General Biology I
- 4 - CH 105 Beg. General and Organic Chemistry¹
- 3 - ENGL 101 Composition I
- 1 - FOR 101 Introduction to Forestry
- 3 - MTHSC 102 Intro. to Mathematical Analysis
- 3 - Elective

18

Second Semester

- 3 - BIOSC 205 Plant Form and Function
- 1 - BIOSC 206 Plant Form and Function Lab.
- 4 - CH 106 Beg. General and Organic Chemistry¹
- 3 - ENGL 102 Composition II
- 1 - FOR 102 Introduction to Forestry
- 3 - MTHSC 207 Multivariable Calculus³
- 3 - Elective

18

Sophomore Year**First Semester**

- 3 - CP SC 120 Issues in Computers
- 3 - FOR 205 Dendrology
- 3 - FOR 221 Wood Properties I
- 4 - PHYS 207 General Physics I
- 3 - Literature Requirement³

16

Second Semester

- 3 - ECON 200 Economic Concepts
- 3 - FOR 222 Wood Properties II
- 2 - FOR 306 Wood and Wood Fiber Identification
- 4 - PHYS 208 General Physics II
- 3 - Social Science Requirement⁴
- 3 - Elective

18

Forestry Summer Camp

- 1 - FOR 254 Forest Products
- 1 - FOR 255 Secondary Wood Products
- 1 - FOR 257 Forest Products Measurements

4

Junior Year**First Semester**

- 3 - ENGL 314 Technical Writing
- 3 - FOR 321 Drying and Machining of Wood
- 3 - FOR 425 Forest Resource Management Plans
- 3 - Statistics Requirement⁵
- 6 - Study Area⁶

18

Second Semester

- 3 - FOR 311 Forest Products Marketing Practices
- 2 - FOR 323 Deterioration and Preserv. of Wood
- 2 - FOR 440 Adhesives and Finishes
- 3 - SPCH 250 Public Speaking
- 6 - Study Area⁶

16

Senior Year**First Semester**

- 3 - FOR 422 Forest Products International Trade
- 3 - FOR 429 Wood Design
- 3 - FOR 430 Composite Wood Materials
- 6 - Study Area⁶
- 3 - Elective

18

Second Semester

- 3 - FOR 419 Senior Problems
- 3 - FOR 420 Forest Products
- 3 - Humanities Requirement E.2⁴
- 6 - Study Area⁶
- 3 - Elective

18

144 Total Semester Hours

¹CH 101/102 may be substituted.²A student with a Mathematics Achievement Test, Level II score of 520 or greater may take MTHSC 106 to satisfy the Mathematics Requirement; otherwise, MTHSC 102 and 207 are required. Two additional hours may be used as electives.³ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.⁴See General Education Requirements.⁵EX ST 301, MTHSC 203, 301.⁶Study areas are Wood Science and Technology, Forest Products Manufacturing Management, and Forest Products Marketing. Select one of these in consultation with advisor.**FOREST RESOURCE MANAGEMENT****Bachelor of Science**

The Forest Resource Management curriculum combines a broad education in the arts and sciences with applied forest sciences. This combination provides the necessary foundation for the scientific management of forest resources, products, and services.

Foresters are qualified for a broad spectrum of employment opportunities in the public and private sectors. They may be engaged as managers, administrators, or owners of forest lands or forest-based businesses; as technical specialists in the production of timber, useable water, wildlife, and aesthetic values,

and in the recreational use of the forest; or as professionals in other areas where the conservation of natural resources is a concern. Foresters earning advanced degrees find employment in academic work and in research conducted by public and private agencies.

The undergraduate curriculum provides a strong program in the basic knowledge and skills required of a professional forester. Forest Resource Management majors will select a minor study area. (See pages 30-36.) The curriculum is also designed to provide the necessary prerequisites for those students who desire to continue in graduate study. The Department of Forestry offers graduate programs that lead to the Master of Science, Master of Forest Resources, and Doctor of Philosophy degrees. The Forest Resource Management curriculum is accredited by the Society of American Foresters.

Freshman Year**First Semester**

- 4 - BIOL 103 General Biology I
- 4 - CH 105 Beg. General and Organic Chemistry¹
- 3 - ENGL 101 Composition I
- 1 - FOR 101 Introduction to Forestry
- 3 - MTHSC 102 Intro. to Mathematical Analysis

15

Second Semester

- 4 - BIOL 104 General Biology II²
- 3 - CP SC 120 Issues in Computers
- 3 - ENGL 102 Composition II
- 3 - FOR 221 Wood Properties I
- 3 - Elective

16

Sophomore Year**First Semester**

- 4 - CSENV 202 Soils
- 3 - FOR 205 Dendrology
- 3 - Literature Requirement³
- 3 - Social Science Requirement⁴
- 3 - Elective

16

Second Semester

- 3 - FOR 206 Forest Ecology
- 4 - PHYS 200 Introductory Physics
- 3 - SPCH 250 Public Speaking
- 3 - Economics Requirement⁵
- 3 - Humanities Requirement E.2⁴

16

Forestry Summer Camp

- 2 - FOR 251 Forest Communities
- 3 - FOR 252 Forest Engineering
- 3 - FOR 253 Forest Resource Measurements I
- 1 - FOR 254 Forest Products
- 1 - FOR 258 Introduction to Forest Pests

10

Junior Year**First Semester**

- 3 - EX ST 301 Introductory Statistics⁶
- 3 - FOR 304 Forest Resource Economics
- 3 - FOR 413 Introductory Forest Pest Management
- 3 - FOR 460 Silviculture I
- 4 - Elective

16

Second Semester

- 3 - ENGL 314 Technical Writing
- 3 - FOR 302 Forest Resource Measurements II
- 2 - FOR 308 Aerial Photographs in Forestry
- 3 - FOR 462 Silviculture II
- 6 - Minor⁷

17

Senior Year**First Semester**

- 4 - FOR 314 Harvesting Forestry Products
- 2 - FOR 416 Forest Policy and Administration
- 3 - FOR 417 Forest Res. Mgt. and Regulation
- 2 - FOR 418 Forest Resource Valuation
- 6 - Minor⁷

17

Second Semester

- 2 - FOR 406 Forest Watershed Management
- 3 - FOR 415 Forest Wildlife Management
- 2 - FOR 423 Current Issues in Natural Resources
- 3 - FOR 425 Forest Resource Management Plans
- 2 - FOR 431 Recreation Resource Planning
- 3 - Minor⁷

15

138 Total Semester Hours

¹CH 101 may be substituted.²Can be satisfied by CH 102 (if CH 101 is taken) or 106 (if CH 105 is taken).³ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.⁴See General Education Requirements.⁵To be selected in consultation with advisor.⁶MTHSC 203, 301, or equivalent may be substituted.⁷To be selected by the end of the sophomore year.**HORTICULTURE****Bachelor of Science**

Horticulture is the art, science, and business of fruit and vegetable crops, ornamental plants, and turf-grasses and their production, utilization, and maintenance. A strong foundation in the basic sciences and humanities is necessary and is built through courses in mathematics, chemistry, botany, physics, computer science, communications, economics, and humanities. Horticulture as a science depends on disciplines such as plant pathology, plant physiology, entomology, forestry, agronomy and soils, agricultural engineering, and agricultural economics. Business electives contribute to a well-rounded curriculum. An ever expanding segment of horticulture involves the management of enterprises, from production to distribution and marketing. Horticulture as an art involves the arrangement of plants in an aesthetically pleasing fashion, an exterior landscape for a residence or building or manicuring a golf green. All aspects of horticultural plants are the realm of the Horticulture major.

The Horticulture major broadly represents all crops and commodities. Though broad training is required of all Horticulture majors, the opportunity exists to tailor one's courses around the traditional commodities by the appropriate selection of electives.

Students find professional development while still enrolled as undergraduates. An internship in a horticultural enterprise is strongly recommended. Students considering graduate school are advised to take optional courses in the basic sciences as well as con-

duct an undergraduate research project. Those with strong interests in a specific discipline may complete special problems under the direct supervision of a faculty member.

Freshman Year

First Semester

- 4 - BIOL 103 General Biology I
- 4 - CH 101 General Chemistry
- 3 - ENGL 101 Composition I
- 3 - HORT 101 Horticulture
- 3 - MTHSC 102 Intro. to Mathematical Analysis

17

Second Semester

- 3 - BIOSC 205 Plant Form and Function
- 1 - BIOSC 206 Plant Form and Function Lab.
- 4 - CH 102 General Chemistry
- 3 - ENGL 102 Composition II
- 3 - EX ST 301 Introductory Statistics or
- 3 - MTHSC 101 Introduction to Probability
- 3 - Social Science Requirement¹

17

Sophomore Year

First Semester

- 3 - BIOSC 406 Introductory Plant Taxonomy
- 1 - BIOSC 407 Plant Taxonomy Lab.
- 3 - CH 223 Organic Chemistry and
- 1 - CH 227 Organic Chemistry Lab. or
- 3 - BIOCH 210 Elementary Biochemistry and
- 3 - BIOCH 211 Elem. Biochemistry Lab. or
- 4 - CH 201 Survey of Organic Chemistry
- 4 - ENT 301 General Entomology
- 3 - HORT 303 Plant Materials
- 3 - Humanities Requirement E.1¹

18

Second Semester

- 4 - CSENV 202 Soils
- 3 - HORT 208 Landscape Appreciation
- 4 - PHYS 200 Introductory Physics
- 3 - SPCH 250 Public Speaking
- 3 - Computer Skills Requirement²

17

Junior Year

First Semester

- 3 - HORT 305 Plant Propagation
- 4 - HORT 456 Vegetable Crops
- 3 - Horticulture Requirement³
- 3 - Humanities Requirement E.2²
- 4 - Science Requirement⁴

17

Second Semester

- 3 - AG M 301 Soil and Water Conservation
- 3 - BIOSC 401 Plant Physiology
- 3 - BIOSC 402 Plant Physiology Lab.
- 3 - HORT 310 Greenhouse Crop Physiology
- 3 - Business Requirement³
- 3 - Writing Intensive Requirement²
- 1 - Elective

17

Senior Year

First Semester

- 3 - HORT 352 Tree Fruit Culture and Phys. or
- 3 - HORT 455 Small Fruit Crops

- 3 - HORT 412 Turfgrass Management
- 3 - Horticulture Requirement³
- 3 - Business Requirement⁵
- 6 - Elective

18

Second Semester

- 1 - HORT 409 Seminar
- 3 - PL PA 401 Plant Pathology
- 3 - Horticulture Requirement³
- 3 - Science Requirement⁴
- 3 - Social Science Requirement²
- 3 - Elective

16

137 Total Semester Hours

¹AP EC 202 or ECON 211.

²See General Education Requirements.

³FOR (HORT) 309, HORT 202, 304, 308, 352 or 455, 400, 406, 415, 416, 461, 470, 472, HORT (CSENV) 433.

⁴See advisor. Select from approved departmental list of upper-division courses as follows:

Group I—biological sciences, genetics, microbiology. (Select at least three credits.)

Group II—agriculture, agronomy, integrated pest management, plant pathology.

⁵Select from the departmental list of approved courses from accounting; agricultural and applied economics; law; management; marketing; and parks, recreation, and tourism management. (See advisor.)

TURFGRASS OPTION

The Turfgrass option, for students interested in careers in the rapidly growing turfgrass industry, specifies courses in turfgrass management, pathology of turf and ornamental plants, agricultural mechanization, personnel management, soil fertility, soil microbiology, weed control, and park and recreation management. Graduates pursue careers in professional lawn-care; maintenance of parks, athletic fields, and golf courses; production and sale of seed, sod, supplies, and equipment; or service as technicians for businesses or government agencies.

Freshman Year

First Semester

- 4 - BIOL 103 General Biology I
- 4 - CH 101 General Chemistry
- 3 - ENGL 101 Composition I
- 3 - HORT 101 Horticulture
- 3 - MTHSC 102 Intro. to Mathematical Analysis

17

Second Semester

- 3 - BIOSC 205 Plant Form and Function
- 1 - BIOSC 206 Plant Form and Function Lab.
- 4 - CH 102 General Chemistry
- 3 - ENGL 102 Composition II
- 3 - EX ST 301 Introductory Statistics or
- 3 - MTHSC 101 Introduction to Probability
- 3 - Social Science Requirement¹

17

Sophomore Year

First Semester

- 3 - CH 223 Organic Chemistry and
- 1 - CH 227 Organic Chemistry Lab. or
- 4 - CH 201 Survey of Organic Chemistry or
- 3 - BIOCH 210 Elementary Biochemistry and
- 1 - BIOCH 211 Elementary Biochem. Lab.

- 3 - HORT 303 Plant Materials
- 3 - HORT 305 Plant Propagation
- 3 - Business Requirement²
- 3 - Social Science Requirement³
- 1 - Elective

17

Second Semester

- 3 - AG M 205 Principles of Farm Shop
- 4 - CSENV 202 Soils
- 3 - HORT 208 Landscape Appreciation
- 3 - Humanities Requirement E.1¹
- 3 - Writing Intensive Requirement¹

16

Junior Year

First Semester

- 4 - ENT 301 General Entomology
- 3 - HORT 412 Turfgrass Management
- 3 - MGT 307 Personnel Management
- 3 - SPCH 250 Public Speaking
- 3 - Science Requirement⁴

16

Second Semester

- 3 - BIOSC 401 Plant Physiology
- 1 - BIOSC 402 Plant Physiology Lab.
- 4 - PHYS 200 Introductory Physics
- 3 - PL PA 401 Plant Physiology
- 3 - Computer Skills Requirement¹
- 3 - Horticulture Requirement²

17

Senior Year

First Semester

- 3 - PL PA (ENT) 406 Diseases and Insects of Turfgrasses
- 3 - Horticulture Requirement⁵
- 3 - Humanities Requirement E.2¹
- 4 - Science Requirement⁴
- 4 - Elective

17

Second Semester

- 3 - AG M 301 Soil and Water Conservation
- 1 - HORT 409 Seminar
- 3 - Horticulture Requirement⁵
- 3 - Science Requirement⁴
- 7 - Elective

17

134 Total Semester Hours

¹See General Education Requirements.

²Select from the departmental list of approved upper-division courses from accounting; agricultural and applied economics; law; management; marketing; and parks, recreation, and tourism management.

³AP EC 202 or ECON 211.

⁴See advisor. Select from the departmental list of approved upper-division courses as follows:

Group I—biological sciences, genetics, microbiology. (Select at least three credits.)

Group II—agriculture, crop and soil environmental science, integrated pest management, plant pathology.

⁵FOR (HORT) 309, HORT 202, 304, 308, 310, 352, 400, 406, 415, 416, 455, 456, 461, 470, 472, HORT (CSENV) 433.

MEDICAL TECHNOLOGY

Bachelor of Science

Medical technology involves the analysis of human body fluids to detect disease conditions. The medical technologist performs and evaluates tests made in several broad disciplines, including clinical chemistry, clinical microbiology, immunohematology, hematology, and blood bank. To perform in such diversified areas, medical technologists must have a broad education in the basic sciences and rigorous training in clinical laboratory science. They must know the principles of test procedures and equipment, as well as the significance of the results of these tests in the diagnosis and treatment of disease. Medical technologists are employed in hospital clinical laboratories and in private, state, and federal health laboratories.

The Medical Technology program consists of three years of lectures and laboratories on the Clemson campus and one year of clinical experience at an accredited school of medical technology. The courses required in the first three years must be completed before the student can begin the clinical (fourth) year. The student must be in good standing at the University and have a grade-point ratio of 2.0 or above before entering a school of medical technology. Each school selects students based on published admission criteria including grade-point ratio, grades in science courses, letters of reference, and interviews. Clemson University is affiliated with McLeod Regional Medical Center and Baptist Medical Center. Applications to this school and others, such as the Medical University of South Carolina, should be made during the first semester of the junior year.

Upon completion of the requirements of the curriculum, the student will receive the Bachelor of Science degree in Medical Technology from Clemson University. In addition to the degree, satisfactory performance on a certification exam is required by most employers.

At this time no new students are being enrolled in the Medical Technology major; however, interested students are encouraged to major in Biochemistry, Biological Sciences, or Microbiology and consult the Medical Technology Program Coordinator regarding the clinical phase of professional preparation.

Freshman Year

First Semester

- 5 - BIOL 110 Principles of Biology I
- 4 - CH 101 General Chemistry
- 3 - ENGL 101 Composition I
- 1 - M T 101 Introduction to Medical Technology
- 4 - MTHSC 106 Calculus of One Variable I

17

Second Semester

- 5 - BIOL 111 Principles of Biology II
- 4 - CH 112 General Chemistry
- 3 - ENGL 102 Composition II
- 3 - EX ST 301 Introductory Statistics or
- 3 - MTHSC 301 Stat. Theory and Meth. I
- 3 - Elective

18

Sophomore Year

First Semester

- 3 - CH 223 Organic Chemistry
- 1 - CH 227 Organic Chemistry Lab.
- 3 - HIST 172 or 173 Western Civilization
- 4 - MICRO 305 General Microbiology
- 4 - PHYS 207 General Physics I
- 3 - Literature Requirement¹

18

Second Semester

- 3 - BIOCH 301 General Biochemistry
- 3 - CH 224 Organic Chemistry
- 1 - CH 228 Organic Chemistry Lab
- 4 - PHYS 208 General Physics II
- 3 - Humanities Requirement²
- 3 - Elective

17

Junior Year

First Semester

- 3 - CH 313 Quantitative Analysis
- 1 - CH 317 Quantitative Analysis Lab.
- 3 - MICRO 414 Basic Immunology
- 3 - English Requirement³
- 4 - Elective

14

Second Semester

- 4 - GEN 302 Introductory Genetics
- 4 - MICRO 411 Pathogenic Bacteriology
- 3 - Humanities Requirement²
- 3 - Option Requirement⁴
- 3 - Social Science Requirement²

17

Senior Year

(52 Weeks)

- 3 - M T 401 Immunology
- 8 - M T 402 Clinical Microbiology
- 5 - M T 403 Hematology and Hemostasis
- 4 - M T 404 Blood Bank
- 2 - M T 407 Urinalysis
- 10 - M T 408 Clinical Chemistry
- 2 - M T 491 Special Topics in Medical Tech.

34

135 Total Semester Hours

¹ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.

²Select from courses required to complete an alternate degree in Microbiology should the student not be accepted to a hospital school after completion of the academic requirement for the baccalaureate degree in Medical Technology.

³Select from advanced writing or public speaking.

⁴To be selected from the following: BIOSC 456, MICRO 400, 401, 412, 413, 415, 416, and other courses that will serve as background courses for medical technology.

Note: The manner in which each accredited clinical program implements the above curriculum may vary because of institutional differences.

MICROBIOLOGY

Bachelor of Science

Microbiology deals with the study of bacteria, viruses, yeasts, filamentous fungi, protozoa, and unicellular algae. Microbiologists seek to describe these organisms in terms of their structures, functions and processes of reproduction, growth, and death, at both the cellular and molecular levels. They are also concerned with their ecology, particularly in regard to their pathological effects on man, and with their economic importance.

The Microbiology major provides a thorough training in the basic microbiological skills. Further, students receive instruction in mathematics, physics, chemistry, and biochemistry, all essential to the training of a modern microbiologist. Students can prepare for a variety of careers through a wide choice of electives. The Microbiology curriculum with Molecular Biology Option is recommended for students planning postgraduate programs. Microbiology graduates may enter graduate school in microbiology, biochemistry, bioengineering or related disciplines; they may enter a medical or dental school or pursue a career in one of the many industries or public service departments dependent upon microbiology. Some of these are the fermentation and drug industries, medical and public health microbiology, various food industries, and agriculture.

Microbiology majors planning to apply for admission to a medical or dental school should inform their advisors immediately upon entering the program.

Freshman Year

First Semester

- 5 - BIOL 110 Principles of Biology I¹
- 4 - CH 101 General Chemistry
- 3 - ENGL 101 Composition I
- 4 - MTHSC 106 Calculus of One Variable I

16

Second Semester

- 5 - BIOL 111 Principles of Biology II¹
- 4 - CH 102 General Chemistry
- 3 - ENGL 102 Composition II
- 1 - MICRO 100 Microbes and Human Affairs
- 3-4 - Mathematical Sciences Requirement²

16-17

Sophomore Year

First Semester

- 3 - CH 223 Organic Chemistry
- 1 - CH 227 Organic Chemistry Lab.
- 3 - CP SC 120 Issues in Computers
- 4 - MICRO 305 General Microbiology
- 3 - Literature Requirement³
- 3 - Social Science Requirement⁴

17

Second Semester

- 3 - BIOCH 301 General Biochemistry
- 3 - CH 224 Organic Chemistry
- 1 - CH 228 Organic Chemistry Lab.
- 3 - Literature Requirement³
- 4-3 - Mathematical Sciences or Science Requirement²
- 3 - Approved Requirement⁶

17-16

Junior Year**First Semester**

- 4 - MICRO 401 Advanced Bacteriology
- 3 - SPCH 250 Public Speaking
- 4-3 - Physics Requirement⁷
- 6-7 - Elective

17

Second Semester

- 4 - MICRO 412 Bacterial Physiology
- 4 - MICRO 415 Microbial Genetics
- 4 - Physics Requirement⁷
- 3 - Social Science Requirement⁴
- 3-4 - Elective

18-19

Senior Year**First Semester**

- 3 - ENGL 314 Technical Writing
- 14-13 - Approved Requirement⁶

17-16

Second Semester

- 4 - MICRO 411 Pathogenic Bacteriology
- 12 - Approved Requirement⁶

16

134 Total Semester Hours

¹BIOL 103 may substitute for BIOL 110, and BIOL 104 may substitute for BIOL 111; the remaining 1-2 hours required must be satisfied by completing 1-2 extra hours in either biological sciences or microbiology.

²Select from MTHSC 108, 301, or EX ST 301. MTHSC 108 is required for Microbiology—Molecular Biology majors.

³ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.

⁴See General Education Requirements.

⁵Select from GEOL 101 or any science course at the sophomore level or above, excluding microbiology, with advisor's approval.

⁶A minimum of 15 credits must be selected from the following: AVS 458, BIOSC 403, 404, 425, 426, 456/457, MICRO 400, 403, 407, 410, 413, 414, 416, 417, 491, PL PA 456.

⁷Select from the following: PHYS 207/208 or 122/221/223.

MOLECULAR BIOLOGY OPTION

See Microbiology curriculum for Freshman year.

Sophomore Year**First Semester**

- 3 - CH 223 Organic Chemistry
- 1 - CH 227 Organic Chemistry Lab.
- 3 - CP SC 120 Issues in Computers
- 4 - MICRO 305 General Microbiology
- 3 - Literature Requirement¹
- 3 - Social Science Requirement²

17

Second Semester

- 3 - BIOCH 301 General Biochemistry
- 3 - CH 224 Organic Chemistry
- 1 - CH 228 Organic Chemistry Lab.
- 3 - Literature Requirement¹
- 3 - Microbiology Requirement¹
- 3 - Social Science Requirement²

16

Junior Year**First Semester**

- 3 - CH 313 Quantitative Analysis
- 1 - CH 317 Quantitative Analysis Lab.

- 4 - MICRO 401 Advanced Bacteriology

- 3 - MICRO 414 Basic Immunology

- 4-3 - Physics Requirement⁴

- 2-3 - Elective

17

Second Semester

- 4 - MICRO 412 Bacterial Physiology
- 3 - MICRO 417 Molecular Mechanisms of Carcinogenesis and Aging
- 3 - SPCH 250 Public Speaking
- 4 - Physics Requirement⁴
- 3 - Elective

17

Senior Year**First Semester**

- 3 - BIOCH 423 Principles of Biochemistry
- 3 - ENGL 314 Technical Writing
- 4 - MICRO 415 Microbial Genetics
- 3 - MICRO 416 Introductory Virology
- 3 - Elective

16

Second Semester

- 3 - BIOCH 432 Biochemistry of Metabolism
- 4 - MICRO 411 Pathogenic Bacteriology
- 3 - MICRO 491 Special Problems
- 8 - Elective

18

134 Total Semester Hours

¹ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.

²See General Education Requirements.

³AVS 458, BIOSC 403, 404, 425, 426, 456/457, MICRO 400, 403, 407, 410, 413, PL PA 456.

⁴Select from the following: PHYS 207/208 or 122/221/223.

PACKAGING SCIENCE**Bachelor of Science**

The Bachelor of Science degree in Packaging Science prepares students for careers in industries producing and utilizing packages for all types of products. Packaging is an essential part of industrialized economies, protecting, preserving, and helping to market products. The field of packaging is highly competitive and highly innovative, requiring an ever-increasing number of professional positions.

Opportunities for employment include a wide variety of career paths such as manufacturing, marketing, sales, design, purchasing, quality assurance, and customer services. Most career opportunities are in positions requiring technical knowledge combined with marketing and management skills.

The core curriculum assures the graduate of having the skills and knowledge required by most entry-level packaging positions. Emphasis area choices allow students to select courses to improve career preparation for specific packaging industry segments. The food packaging emphasis area prepares students for this technically challenging field; the general packaging emphasis area allows concentrations in other speciality areas, such as environmental science or graphic communications.

Students changing majors to Packaging Science must have at least a 2.0 cumulative grade-point ratio.

Freshman Year**First Semester**

- 4 - BIOL 103 General Biology I
- 4 - CH 101 General Chemistry
- 3 - ENGL 101 Composition I
- 1 - PKGSC 101 Packaging Orientation
- 3 - Mathematical Sciences Requirement¹

15

Second Semester

- 4 - BIOL 104 General Biology II
- 4 - CH 102 General Chemistry
- 3 - ENGL 102 Composition II
- 4 - MTHSC 106 Calculus of One Variable I
- 2 - PKGSC 102 Intro. to Packaging Science
- 1 - Elective

18

Sophomore Year**First Semester**

- 4 - CH 201 Survey of Organic Chemistry or
- 3 - CH 223 Organic Chemistry and
- 1 - CH 227 Organic Chemistry Lab.
- 3 - CP SC 120 Issues in Computers
- 4 - PHYS 207 General Physics I²
- 3 - PKGSC 202 Packaging Materials and Manufacturing
- 3 - THRD 180 Introduction to Technical Drawing and Computer Aided Drafting³

17

Second Semester

- 4 - FD SC 214 Food Resources and Preservation
- 4 - G C 104 Graphic Communications I
- 3 - PKGSC 204 Container Systems
- 1 - PKGSC 206 Container Systems Lab.
- 3 - Emphasis Area¹
- 3 - Humanities Requirement E.1⁴

18

- 0 - CO-OP 101 Cooperative Education⁵

Junior Year**First Semester**

- 3 - EX ST 301 Introductory Statistics
- 4 - MICRO 305 General Microbiology
- 3 - PKGSC 404 Mech. Properties of Packages and Principles of Package Evaluation
- 2 - PKGSC 454 Package Evaluation Lab.
- 3 - Social Science Requirement⁶
- 3 - Elective

18

Second Semester

- 3 - ENGL 304 Business Writing
- 3 - PKGSC 316 Application of Polymers in Packaging
- 3 - SPCH 250 Public Speaking
- 5 - Emphasis Area¹
- 3 - Social Science Requirement⁶

17

Senior Year**First Semester**

- 3 - PKGSC 368 Packaging and Society
- 3 - PKGSC 420 Package Design and Dev.
- 4 - Emphasis Area¹
- 3 - Humanities Requirement E.2⁴
- 3 - Elective

16

Second Semester

- 3 - PKGSC 401 Packaging Machinery
- 3 - PKGSC 440 Packaging Distribution
- 3 - PKGSC 464 Food Packaging Systems
- 1 - PKGSC 466 Food Packaging Systems Lab.
- 3 - Emphasis Area¹
- 3 - Elective

16

135 Total Semester Hours

¹See advisor.²PHYS 122 and 124 may be substituted.³E G 208 may be substituted.⁴See General Education Requirements.⁵Student is required to complete at least one 15-week period (six months preferred) of Cooperative Education.⁶AP EC 202 or ECON 211 and a selection of three credits from the following: HIST 101, 102, 172, 173, PO SC 101, PSYCH 201, R S (SOC) 401; SOC 201, GEOG 101 or 103.**PLANT PATHOLOGY****Bachelor of Science**

Plant pathology, the study of plant diseases, is a challenging biological and agricultural science. As a career, it is exciting, essential, and rewarding. As a profession, it requires ambition, skill, and dedication, while offering the opportunity for intellectual and personal fulfillment. Plant pathologists continually pit their abilities and energies against more than 50,000 destructive plant diseases.

Job opportunities include private consulting, cooperative extension services, agricultural sales, federal and state government and foreign service, technical work, biotechnology, various integrated pest-management programs, farming, and graduate programs. Salaries are competitive with other biological and agricultural professions.

Advisors for Plant Pathology undergraduates attempt to tailor the program of study to fit the student's long-term goals.

Freshman Year**First Semester**

- 4 - BIOL 103 General Biology I or
- 5 - BIOL 110 Principles of Biology I
- 4 - CH 101 General Chemistry
- 3 - ENGL 101 Composition I
- 3 - MTHSC 102 Intro. to Mathematical Analysis

Second Semester

- 4 - BIOL 104 General Biology II or
- 5 - BIOL 111 Principles of Biology II
- 4 - CH 102 General Chemistry
- 3 - ENGL 102 Composition II
- 3 - Elective

Sophomore Year**First Semester**

- 3 - CH 223 Organic Chemistry
- 1 - CH 227 Organic Chemistry Lab.
- 4 - CSENV 202 Soils
- 4 - ENT 301 General Entomology
- 3 - Computer Skills Requirement¹
- 3 - Humanities Requirement E.1¹

18

Second Semester

- 3 - AP EC 202 Agricultural Economics
- 3 - CH 224 Organic Chemistry
- 4 - GEN 302 Introductory Genetics
- 4 - PHYS 200 Introductory Physics
- 3 - Humanities Requirement E.2¹

17

Junior Year**First Semester**

- 3 - BIOCH 301 General Biochemistry
- 4 - MICRO 305 General Microbiology
- 3 - PL PA 401 Plant Pathology
- 3 - Social Science Requirement¹
- 3 - Elective

16

Second Semester

- 3 - BIOSC 401 Plant Physiology
- 1 - BIOSC 402 Plant Physiology Lab.
- 3 - BIOSC 406 Introductory Plant Taxonomy
- 1 - BIOSC 407 Introductory Plant Taxon. Lab.
- 3 - SPCH 250 Public Speaking
- 2-3 - Plant Pathology Requirement²
- 3 - Writing Intensive Requirement¹

16-17

Senior Year**First Semester**

- 3 - BIOSC 425 Introductory Mycology
- 3 - BIOSC 426 Mycology Practicum
- 3 - EX ST 301 Introductory Statistics
- 3 - Departmental Requirement³
- 7 - Elective

18

Second Semester

- 3 - BIOSC 452 Plant Anatomy and Morphology
- 2 - BIOSC 453 Plant Anatomy and Morph. Lab.
- 3 - Departmental Requirement³
- 3 - Plant Pathology Requirement²
- 6 - Elective

17

130-133 Total Semester Hours

¹See General Education Requirements.²At least two courses selected from the following: PL PA 402, (ENT) 406, 411, 458.³At least six credits must be selected from the following: BIOCH 423, 433, CH 313, 317, CSENV 405, 407, 421, 422, 423, 425, 490, ENT 401, HORT 305, 352, 455, MICRO 416, PL PH 320.**PREPROFESSIONAL HEALTH STUDIES****Non-degree**

The health professions need individuals with a diversity of educational backgrounds and a wide variety of talents and interests. The philosophies of education, the specific preprofessional course requirements, the noncognitive qualifications for enrollment, and the systems of training vary among the professional health schools; but all recognize the desirability of a broad education—a good foundation in the natural sciences, highly developed communication skills, and a solid background in the humanities and social sciences. The absolute requirements for admission to professional health schools are limited

to allow latitude for developing individualized undergraduate programs of study; however, most schools of medicine and dentistry require 16 semester hours of chemistry, including organic chemistry, eight hours of biological sciences, eight hours of physics, and at least one course in calculus. These requirements should be balanced with courses in vocabulary building, the humanities, and social sciences. The basic requirements in the natural sciences and as many of the courses in the humanities and social sciences as possible should be completed by the third year so that the student will be prepared to take the Dental Admission Test or the Medical College Admission Test prior to applying to a professional school.

Undergraduates may also prepare to study optometry, podiatry, and other health professions. While the basic requirements for these professional schools are essentially the same as those for schools of medicine and dentistry, specific requirements for individual schools in these professions vary somewhat; consequently, the interested student is advised to consult with the chief health professionals advisor.

At Clemson, rather than having a separate, organized preprofessional health study program, the student is allowed to major in any curriculum, as long as the basic entrance requirements of the professional health school are fulfilled. These schools are not as concerned about a student's major as they are about academic performance whichever curriculum he or she chooses. Professional health schools have neither preferences nor prejudices concerning any curriculum, which is evidenced by the fact that their entering students represent a broad spectrum of curricula. The emphasis is placed on the student doing well in the curriculum chosen, and this becomes critical as competition increases for the limited number of places available in professional health schools.

PREALLIED HEALTH

(See Prerehabilitation Sciences.)

PREOCCUPATIONAL THERAPY

(See Prerehabilitation Sciences.)

PREPHARMACY

Prepharmacy is a two-year program requiring a minimum of 68 semester hours. Upon completion of the curriculum, students will be eligible to apply to a college of pharmacy, usually the Medical University of South Carolina or the University of South Carolina. The degree in Pharmacy is awarded by the institution attended. It is important for the students to work closely with their advisor as there are variations in courses required by the pharmacy schools.

For financial aid purposes, students in the Prepharmacy program are considered to be enrolled in a degree-seeking program.

First Year**First Semester**

- 4 - BIOL 103 General Biology I
- 4 - CH 101 General Chemistry
- 3 - ENGL 101 Composition I
- 3 - MTHSC 101 Introduction to Probability¹ or
- 3 - HIST 365 English Cultural History²
- 3 - PSYCH 201 Introduction to Psychology

17

Second Semester

- 4 - BIOL 104 General Biology II
- 4 - CH 102 General Chemistry
- 3 - ECON 200 Economic Concepts
- 3 - ENGL 200 Composition II
- 4 - MTHSC 106 Calculus of One Variable or
- 3 - MTHSC 102 Intro. to Math. Analysis

17-18

Second Year**First Semester**

- 3 - CH 223 Organic Chemistry
- 1 - CH 227 Organic Chemistry Lab.
- 4 - MICRO 305 General Microbiology or
- 3-4 - Physiology Requirement¹
- 4 - PHYS 207 General Physics I
- 3 - Fine Arts Requirement⁴
- 4 - Foreign Language Requirement or
- 3 - Liberal Arts Requirement⁵

17-19

Second Semester

- 3 - CH 224 Organic Chemistry
- 1 - CH 228 Organic Chemistry Lab.
- 3 - MTHSC 301 Stat. Theory and Methods I or
- 3 - EX ST 301 Introductory Statistics
- 4 - PHYS 208 General Physics II
- 3 - SPCH 150 Intro. to Speech Communication
- 4 - Foreign Language Requirement or
- 3 - Liberal Arts Requirement⁵

17-18

68-72 Total Semester Hours

¹Chemistry requires proficiency in algebra; physics requires proficiency in trigonometry; therefore, entering freshmen must present a score of 520 or above on the Mathematics Achievement Test, Level II or register in the first semester in MTHSC 105.

²The Medical University of South Carolina requires a math course. The University of South Carolina requires a history course. To be eligible for both professional schools, the course not taken this semester must be taken during a summer term.

³The Medical University of South Carolina requires MICRO 305. The University of South Carolina requires a physiology course. To be eligible for both professional schools, the course not taken this semester must be taken during a summer term.

⁴See advisor.

⁵The University of South Carolina requires credit for two semesters of a foreign language or exemption by examination. Students exempting the foreign language must take a liberal arts requirement. Either the foreign language or the liberal arts requirement meets the Medical University of South Carolina requirement.

PREPHYSICAL THERAPY

(See Prerehabilitation Sciences.)

PREPHYSICIAN ASSISTANT PROGRAM

(See Prerehabilitation Sciences.)

PREREHABILITATION SCIENCES

Prerehabilitation Sciences includes study areas in physical therapy, occupational therapy, physician assistant, and allied health areas. This curriculum is designed to meet the requirements of the rehabilitation medicine programs at the Medical University of South Carolina and other professional schools.

This program requires a minimum of 68-90 semester hours of undergraduate coursework depending on the study area. In addition, students must apply to a professional school for acceptance into its program.

Because preparation of some of the study areas requires three years, students are advised to select a major with similar requirements after consultation with the Prerehabilitation Sciences advisor. The following curriculum fulfills the general requirements for those fields, requiring only two years of prerequisites. The Prephysical Therapy and Preoccupational Therapy study areas require an additional year of electives. These electives should be chosen after consultation with the advisor. Professional schools may change their requirements at any time, so it is imperative that students in this major stay in close contact with their advisor.

For financial aid purposes, students in the Prerehabilitation Sciences program are considered to be enrolled in a degree-seeking program.

First Year**First Semester**

- 4 - BIOL 103 General Biology I
- 4 - CH 101 General Chemistry
- 3 - ENGL 101 Composition I
- 3 - PSYCH 201 Introduction to Psychology
- 3-4 - Mathematical Sciences Requirement^{1,2}

17-18

Second Semester

- 4 - BIOL 104 General Biology II
- 4 - CH 102 General Chemistry
- 3 - ENGL 102 Composition II
- 3 - Humanities Requirement¹
- 3 - Mathematical Sciences Requirement^{1,2}

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Second Year**First Semester**

- 4 - BIOSC 222 Human Anatomy and Phys. I
- 4 - PHYS 207 General Physics I
- 3 - PSYCH 340 Life-span Developmental Psych.
- 3 - Humanities Requirement¹
- 3 - Literature Requirement⁴

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Second Semester

- 4 - BIOSC 223 Human Anatomy and Phys. II
- 3 - CP SC 120 Issues in Computers
- 3 - HIST 365 English Cultural History
- 4 - PHYS 208 General Physics II
- 3 - SPCH 150 Intro. to Speech Communication

17

Third Year⁵**68-90 Total Semester Hours**

¹Chemistry requires proficiency in algebra; physics requires proficiency in trigonometry; therefore, entering freshmen must present a score of 520 or above on the Mathematics Achievement Test, Level II or register in the first semester for MTHSC 105.

²Students scoring 520 or better on the Mathematics Achievement Test, Level II take MTHSC 106 and EX ST 301 or MTHSC 301; those scoring less than 520 but better than 450 will take MTHSC 101 and EX ST 301 or MTHSC 102 and 301.

³See General Education Requirements.

⁴ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.

⁵Currently only the Prephysical Therapy and Preoccupational Therapy study areas require a third year. Although any credit course may satisfy the requirements for the third year, students are advised to select courses in consultation with the advisor to satisfy General Education Requirements.

PREVETERINARY MEDICINE

Under a regional plan, the South Carolina Preveterinary Advisory Committee coordinates a program for South Carolina residents who are interested in pursuing careers in veterinary medicine. South Carolina residents attending any college or university may apply through the Veterinary Medical College Application Service (VMCAS) to the University of Georgia College of Veterinary Medicine. Currently the University of Georgia admits up to 17 students each year through arrangements with the Southern Regional Education Board. The State of South Carolina also has a contract with Tuskegee University to admit up to four South Carolina residents. Application must be made directly to Tuskegee University.

Minimum requirements for admission to a college of veterinary medicine generally include the satisfactory completion of prescribed courses in a well-rounded undergraduate degree program. Specific requirements for admission to the University of Georgia College of Veterinary Medicine include the following undergraduate courses: six credits of English, 14 credits of humanities and social studies, ten of physics, seven of general biology, seven credits of advanced biology, three credits of biochemistry and 14 credits of organic and inorganic chemistry. (Chemistry and physics courses must be at the pre-medical level; they may not be survey courses.)

To be in the best competitive position, applicants should complete courses in animal agriculture, genetics, nutrition, biochemistry, and advanced biology. Considerations for selection are character, scholastic achievement, personality, experience with large and small animals, general knowledge, and motivation. In the past, competition has been keen, and only those applicants who have shown exceptional ability have been admitted. Specific considerations may include a minimal grade-point average and completion of standardized tests such as the Graduate Record Examination and the Veterinary College Admission Test.

Since out-of-state students attending Clemson are ineligible to apply to the University of Georgia or Tuskegee University under the South Carolina quota, they should contact the college(s) of veterinary medicine to which they plan to apply. They may apply at the University of Georgia for at-large admission.

Veterinary schools accept students with a broad range of academic backgrounds; therefore, it is recommended that the beginning university student select any undergraduate major and simultaneously complete the courses required for veterinary school entrance and those required for completion of a BS or BA degree. For students selecting Animal and Veterinary Sciences or Biological Sciences at Clemson University, the basic curricula have been designed to accommodate Georgia's entrance requirements. For further information, contact the Department of Animal and Veterinary Sciences at (864) 656-3427.

COLLEGE OF ARCHITECTURE, ARTS, AND HUMANITIES

The collaboration of Architecture (Landscape Architecture, Construction Science and Management, City and Regional Planning, and Architecture) with Arts (Visual Arts and Performing Arts) and the Humanities (English, History, Languages, Philosophy and Religion, and Speech and Communication Studies) produces a remarkably rich environment for study. The mixture of core disciplines with applied professions/disciplines in the College provides both depth and breadth in learning. This structure affords students and faculty with skills that address the complex and interconnected challenges of the future, where it is no longer possible for these problems to be solved in a single discipline or profession. It is through the connections and communication between specialized knowledge areas that significant cultural progress will be made. These kinds of thoughts and actions form a fundamental part of the College of Architecture, Arts, and Humanities.

To illustrate these ideas, consider the diversity of communication skills practiced and taught in the College. Students learn graphic and artistic communication, technical communication with computers, spoken communication, and communication through the written word. Each skill is vital to a successful student, and it is the collaboration between these forms of communication that prepares students for the complex challenges of the future.

SCHOOL OF DESIGN AND BUILDING AND SCHOOL OF THE ARTS

The undergraduate Design degree program (the Bachelor of Arts in Design or the Bachelor of Science in Design) is the preprofessional preparation for two years of graduate study leading to the professional Master of Architecture degree, which is the fully accredited professional degree in this field. The accredited Bachelor of Science in Construction Science and Management program prepares students for careers as professional managers in the construction industry. A graduate program in Construction Science and Management is also offered leading to the Master of Construction Science and Management. The Fine Arts program offers professional study in the studio visual arts leading to the Bachelor of Fine Arts degree. A graduate program leading to the Master of Fine Arts is also offered. The accredited five-year Bachelor of Landscape Architecture degree program prepares students for careers as professional landscape architects. A graduate program in City and Regional Planning is housed within the school and accepts graduates from a variety of baccalaureate programs and prepares them for careers in both public and private sector planning through its Master of City and Regional Planning degree.

In addition to the facilities housed in Lee Hall on the Clemson campus, the College offers students

the opportunity to study at two off-campus sites. The College has a center at the College of Charleston. It is available to third- and fourth-year architecture and fourth-year landscape architecture students for a semester's study in Charleston while earning credit from both Clemson University and the College of Charleston. The Charles E. Daniel Center for Building Research and Urban Studies in Genoa, Italy, provides graduate students and upper division undergraduate students in the above mentioned programs a semester's residence in an intensive program of study and travel while earning full credit toward their degree.

Entrance Requirements

Admission to degree programs in the School of Design and Building and the School of the Arts is based on academic performance and is limited based on space availability in the various programs. Students wishing admission are advised to make application to the Admissions Office early in the fall of their senior year in high school. They are also encouraged to visit the school during their senior year of high school. Faculty are available to meet with them and their parents in an informal setting to answer questions and discuss individual programs in more detail. Prospective students may schedule appointments by calling the individual department.

Policy on Change of Major within or into Degree Programs in the School of Design and Building

When space is available, a student may change majors to one of the degree programs with a 2.5 cumulative grade-point ratio, at least 30 credit hours earned, and design aptitude evidenced by a portfolio review (except Construction Science and Management majors, who may initiate a change-of-major agreement), or by approval of the department chair.

Policy and Advancement in Design

Students enrolled in second-, third-, or fourth-year design studios and theory courses must attain at least a 2.0 grade-point ratio in each year level (by repeating one or both semesters, if necessary) to qualify for advancement to the next year level or in the case of fourth-year Design studios, to qualify for the Design degree, or in Landscape Architecture at the fifth year to qualify for the Bachelor of Landscape Architecture degree.

SCHOOL OF HUMANITIES

The Bachelor of Arts degree is offered in English, History, Language and International Trade, Modern Languages, Philosophy, and Speech and Communication Studies.

As soon as feasible and not later than the end of the sophomore year, students seeking the Bachelor of Arts degree in one of the fields listed above, except Language and International Trade, will select a minor field of concentration (or a double major with another Bachelor of Arts degree program). Refer to the chart on page 30 for acceptable minors.

To achieve depth as well as breadth in their educational experiences, students majoring in English, History, Modern Languages, Philosophy, or Speech and Communication Studies complete at least 24

semester hours from courses above the sophomore level. Students also choose minor concentrations consisting of at least 15 additional semester hours. Courses satisfying the major may not also be included in the minor. A second major concentration (a double major) may substitute for the minor, provided all requirements are fulfilled for each major.

The Bachelor of Arts in English, History, Modern Languages, Philosophy, and Speech and Communication Studies requires 130 total semester credits; Language and International Trade requires 129-137, depending on the option. Of these, at least 12 credits must be earned in humanities courses numbered 300 or higher (A A H 210, MUSIC 210 and THEA 210 excepted) and at least 12 credits in social science courses numbered 300 or higher. The humanities for this purpose are considered to include art and architectural history, English (except 304, 312, 314, 316, 331, 333, 334, 335, 485, 490, 495), languages, music, philosophy, religion, speech (except 362 and 364), theatre (except 377, 487, and 497), and women's studies, as well as courses entitled humanities. The social sciences for this purpose are considered to include agricultural and applied economics, anthropology, economics, geography, history, political science, psychology, and sociology. The foreign language requirement in humanities is a proficiency requirement. Students must complete through 202 in one of the following languages: Chinese, French, German, Italian, Japanese, Latin, Portuguese, Russian, Spanish.

Students enrolled in degree programs offered in the humanities who expect to teach in the public schools may elect education courses required for teaching certificates by the South Carolina State Department of Education. Such courses are to be approved by their own department advisors.

Students may transfer into the Undeclared category in the Humanities only if they have completed 45 or few credit hours.

ARCHITECTURE

Architects have a creative responsibility of designing the buildings which shape our physical environment. To understand the humanistic, economic, and technological nature of environmental problems, students must have a sound general education. Subsequent professional education must be preparation for a life of continuing change in which the problems to be solved will be large and small, for every sort of function, in every type of climate, and for every condition of budget.

Architectural Registration/Licensure

Most states require that an individual intending to become an architect hold an accredited degree. There are two types of degrees that are accredited by the National Architectural Accrediting Board: (1) the Bachelor of Architecture, which requires a minimum of five years of study, and (2) the Master of Architecture, which requires a minimum of three years of study following an unrelated bachelor's degree or two years following a related preprofessional bachelor's degree. The professional degrees are structured to educate those who aspire to registration/licensure as architects.

The four-year preprofessional degree, where offered, is not accredited by NAAB; it is useful for those wishing a foundation in the field of architecture, as preparation for either continued education in a professional degree program, or for employment options in architecturally related areas.

Bachelor of Arts in Design

Freshman Year

First Semester

- 3 - A A H 101 Survey of Art and Arch. History I
 - 3 - DSIGN 151 Design Studies I
 - 1 - DSIGN 153 Design Theory I
 - 3 - ENGL 101 Composition I
 - 4 - MTHSC 106 Calculus of One Variable I¹
 - 4 - PHYS 207 General Physics I²
- 18

Second Semester

- 3 - A A H 102 Survey of Art and Arch. History II
 - 3 - DSIGN 152 Design Studies II
 - 1 - DSIGN 154 Design Theory II
 - 3 - ENGL 102 Composition II
 - 3 - MTHSC 301 Stat. Theory and Methods I¹
 - 4 - PHYS 208 General Physics II²
 - 1 - Elective
- 18

Sophomore Year

First Semester

- 3 - A A H 203 History and Theory of Arch. I
 - 3 - C S M 201 Structures I
 - 3 - CP SC 120 Issues in Computers
 - 5 - DSIGN 251 Design Studies III
 - 1 - DSIGN 253 Design Theory III
 - 3 - Art Requirement³
- 18

Second Semester

- 3 - A A H 204 History and Theory of Arch. II
 - 3 - C S M 202 Structures II
 - 5 - DSIGN 252 Design Studies IV
 - 1 - DSIGN 254 Design Theory IV
 - 3 - Art Requirement³
 - 3 - Social Science Requirement⁴
- 18

Junior Year

First Semester

- 3 - C S M 301 Structures III
 - 5 - DSIGN 351 Design Studies V
 - 1 - DSIGN 353 Design Theory V
 - 3 - ENGL 314 Technical Writing
 - 4 - Foreign Language Requirement⁵
 - 3 - Elective
- 19

Second Semester

- 5 - DSIGN 352 Design Studies VI
 - 1 - DSIGN 354 Design Theory VI
 - 3 - SPCH 250 Public Speaking
 - 4 - Foreign Language Requirement⁵
 - 3 - Elective
- 16

Senior Year

First Semester

- 3 - C S M 304 Environmental Systems I
 - 5 - DSIGN 451 Design Studies VII
 - 1 - DSIGN 453 Design Theory VII
 - 3 - Foreign Language Requirement⁵
 - 3 - Literature Requirement⁶
 - 3 - Elective
- 18

Second Semester

- 5 - DSIGN 452 Design Studies VIII
 - 1 - DSIGN 454 Design Theory VIII
 - 3 - Foreign Language Requirement⁵
 - 3 - Major Studies Requirement⁷
 - 3 - Social Science Requirement⁴
- 15

140 Total Semester Hours

¹The sequence MTHSC 101, 203 and 102 may be substituted.

²With consent of advisor, BIOL 103, 104; CH 101, 102; GEOL 101, 102 may be substituted for PHYS 207 and 208.

³ART 205, 207, 209, 211, 213, 215, 217, 219.

⁴See General Education Requirements.

⁵With consent of advisor, modern language may be taken in the freshman and sophomore years.

⁶ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.

⁷See advisor.

Bachelor of Science in Design

Freshman Year

First Semester

- 3 - A A H 101 Survey of Art and Arch. History I
 - 3 - DSIGN 151 Design Studies I
 - 1 - DSIGN 153 Design Theory I
 - 3 - ENGL 101 Composition I
 - 4 - MTHSC 106 Calculus of One Variable I¹
 - 4 - PHYS 207 General Physics I
- 18

Second Semester

- 3 - A A H 102 Survey of Art and Arch. History II
 - 3 - DSIGN 152 Design Studies II
 - 1 - DSIGN 154 Design Theory II
 - 3 - ENGL 102 Composition II
 - 3 - MTHSC 301 Stat. Theory and Methods I¹
 - 4 - PHYS 208 General Physics II
 - 1 - Elective
- 18

Sophomore Year

First Semester

- 3 - A A H 203 History and Theory of Arch. I
 - 3 - C S M 201 Structures I
 - 3 - CP SC 120 Issues in Computers
 - 5 - DSIGN 251 Design Studies III
 - 1 - DSIGN 253 Design Theory III
 - 3 - Art Requirement²
- 18

Second Semester

- 3 - A A H 204 History and Theory of Arch. II
 - 3 - C S M 202 Structures II
 - 5 - DSIGN 252 Design Studies IV
 - 1 - DSIGN 254 Design Theory IV
 - 3 - Art Requirement²
 - 3 - Literature Requirement³
- 18

Junior Year

First Semester

- 3 - C S M 301 Structures III
 - 5 - DSIGN 351 Design Studies V
 - 1 - DSIGN 353 Design Theory V
 - 3 - ENGL 314 Technical Writing
 - 3 - Social Science Requirement⁴
 - 3 - Elective
- 18

Second Semester

- 5 - DSIGN 352 Design Studies VI
 - 1 - DSIGN 354 Design Theory VI
 - 3 - SPCH 250 Public Speaking
 - 3 - Major Studies Requirement³
 - 3 - Elective
- 15

Senior Year

First Semester

- 3 - C S M 304 Environmental Systems I
 - 5 - DSIGN 451 Design Studies VII
 - 1 - DSIGN 453 Design Theory VII
 - 3 - Major Studies Requirement³
 - 3 - Social Science Requirement⁴
 - 3 - Elective
- 18

Second Semester

- 5 - DSIGN 452 Design Studies VIII
 - 1 - DSIGN 454 Design Theory VIII
 - 9 - Major Studies Requirement³
- 15

138 Total Semester Hours

¹A sequence of MTHSC 101, 203 and 102 will be accepted in lieu of MTHSC 106 and 301.

²ART 205, 207, 209, 211, 213, 215, 217, 219.

³ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.

⁴See General Education Requirements.

⁵See advisor.

CONSTRUCTION SCIENCE AND MANAGEMENT

Bachelor of Science

As the largest single industry in the United States and one of the most important, construction offers unlimited opportunities to highly motivated and professionally educated men and women. Future professionals must be skilled in managing people, equipment, and capital, coupled with a grasp of construction materials and methods and the complex technologies of modern construction. The Bachelor of Science in Construction Science and Management curriculum is the basis for a career in construction or as a developer or building management specialist.

Freshman Year

First Semester

- 3 - A A H 210 Intro. to Art and Architecture
 - 3 - DSIGN 151 Design Studies I
 - 1 - DSIGN 153 Design Theory I
 - 3 - ENGL 101 Composition I
 - 4 - MTHSC 106 Calculus of One Variable I¹
 - 4 - PHYS 207 General Physics I
- 18

Second Semester

- 3 - C S M 100 Introduction to Construction Science and Management
- 3 - CP SC 120 Issues in Computers
- 3 - ENGL 102 Composition II
- 3 - MTHSC 301 Stat. Theory and Methods I¹
- 4 - PHYS 208 General Physics II

16

Sophomore Year**First Semester**

- 2 - B E 221 Surveying for Soil and Water Res.
- 3 - C S M 201 Structures I
- 3 - C S M 203 Materials and Methods of Const. I
- 3 - ECON 211 Principles of Microeconomics
- 3 - Literature Requirement²
- 3 - Elective

17

Second Semester

- 3 - ACCT 203 Financial Accounting
- 3 - C S M 202 Structures II
- 3 - C S M 204 Contract Document
- 3 - C S M 205 Materials and Methods of Const. II
- 3 - ECON 212 Principles of Macroeconomics
- 3 - SPCH 150 Intro. to Speech Communication or
- 3 - SPCH 250 Public Speaking

18

Junior Year**First Semester**

- 3 - C S M 301 Structures III
- 3 - C S M 351 Construction Estimating
- 3 - MGT 307 Personnel Management
- 3 - Major Requirement³
- 3 - Writing Intensive Requirement⁴
- 3 - Elective

18

Second Semester

- 3 - C S M 303 Soils and Foundations
- 3 - C S M 304 Environmental Systems I
- 3 - C S M 352 Construction Scheduling
- 3 - C S M 353 Construction Estimating II
- 3 - LAW 322 Legal Environment of Business
- 3 - Elective

18

Senior Year**First Semester**

- 3 - C S M 411 Safety in Building Construction
- 3 - C S M 453 Construction Project Management
- 3 - C S M 461 Construction Economics Seminar
- 6 - Major Requirement³

15

Second Semester

- 6 - C S M 454 Construction Capstone
- 0 - C S M 491 Construction Science and Management Internship and Examination
- 6 - Major Requirement³
- 3 - Elective

15

135 Total Semester Hours

¹The sequence MTHSC 101, 102 and 203 may be substituted.²ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.³Select from approved departmental list or as approved in writing by advisor and department chair.⁴See General Education Requirements.*Note:* A minimum of 800 hours of construction experience will be required prior to graduation.**ENGLISH****Bachelor of Arts**

The purposes of a major in English are to help students acquire an understanding of our literary heritage; develop an appreciation and practical knowledge of the modes of literary expression, research, and criticism; improve the ability to write effectively and intelligently; gain insights into literature as a humane study; and prepare for advanced work in English language, literature, and related disciplines.

The program of study for a major concentration in English consists of courses stipulated in the basic curriculum¹ for the Bachelor of Arts and 25 semester credits of English, arranged as follows:

Group I—ENGL 190 and 411.

Group II—Three credits from ENGL 405, 407, 408, 409, 410, 412, 413, 414.

Group III—Three credits from ENGL 406, 415, 416, 417, 418.

Group IV—Three credits from ENGL 422, 423, 424, 425.

Group V—Three credits from ENGL 400, 401, 435, 491, 492.

Group VI—Nine additional credits from 300- and 400-level courses, at least six credits from the 400 level.

The department requires proficiency in composition for all of its majors and minors. English majors or minors with writing problems must overcome them in the Writing Laboratory.

Electives are added as necessary to meet the minimum number of 130 credits for graduation.

¹No course may be used to satisfy both major and minor requirements.**Freshman Year****First Semester**

- 3 - ENGL 101 Composition I
- 3 - HIST 172 Western Civilization
- 4 - Foreign Language Requirement
- 3 - Mathematical Sciences Requirement¹
- 4 - Science Requirement²

17

Second Semester

- 3 - ENGL 102 Composition II
- 3 - HIST 173 Western Civilization
- 4 - Foreign Language Requirement
- 3 - Mathematical Sciences Requirement¹
- 4 - Science Requirement²

17

Sophomore Year**First Semester**

- 3 - CP SC 120 Issues in Computers
- 3 - Fine Arts Requirement¹
- 3 - Foreign Language Requirement²
- 3 - Literature Requirement⁴
- 6 - Elective

18

Second Semester

- 3 - Foreign Language Requirement
- 3 - Literature Requirement⁴
- 10 - Major and Minor Areas

16

Junior Year**First Semester**

- 9 - Major and Minor Areas
- 3 - Oral Communication Requirement²
- 3 - Writing Intensive Requirement²

15

Second Semester

- 3 - History Requirement²
- 6 - Major and Minor Areas
- 3 - Philosophy or Religious Studies Requirement⁴
- 3 - Elective

15

Senior Year**First Semester**

- 3 - History Requirement²
- 9 - Major and Minor Areas
- 5 - Elective

17

Second Semester

- 6 - Advanced Social Science Requirement¹
- 9 - Major and Minor Areas

15

130 Total Semester Hours

¹See advisor.²See General Education Requirements.³Select from A A H 101, 210, ENGL 357, HUM 301, 302, 306, MUSIC 210, 311, 315, 316, THEA 210.⁴ENGL 203 and 204 or 207 and 208 are recommended.⁵Select from the following sequences: HIST 361/363, 316/361, 316/363, or 316/365.⁶Select from PHIL 101, 102, 103, REL 101, 102

FINE ARTS

Bachelor of Fine Arts

The Bachelor of Fine Arts degree is the recognized professional undergraduate degree in the visual arts. The program in Fine Arts prepares students interested in a balanced curriculum of academic coursework and studio art and art history courses for careers in studio-related areas of the visual arts.

Students begin to concentrate their studio coursework in a specific area of the visual arts—ceramics, drawing, painting, photography, printmaking, or sculpture—in the junior year in preparation for the senior studio experience. The program is structured so that the concentrated studio experiences in the junior year allow students opportunities to explore and develop concepts and skills that lead to a cohesive body of artwork in the senior year and a portfolio for professional application or graduate study.

Freshman Year

First Semester

- 3 - A A H 101 Survey of Art and Arch. History I
- 3 - ART 205 Beginning Drawing
- 3 - DESIGN 151 Design Studies I
- 1 - DESIGN 153 Design Theory I
- 3 - ENGL 101 Composition I
- 3 - MTHSC 101 Introduction to Probability

16

Second Semester

- 3 - A A H 102 Survey of Art and Arch. History II
- 3 - ART 207 Beginning Painting
- 3 - DESIGN 152 Design Studies II
- 1 - DESIGN 154 Design Theory II
- 3 - ENGL 102 Composition II
- 3 - MTHSC 102 Intro. to Mathematical Analysis

16

Sophomore Year

First Semester

- 3 - A A H 205 History and Theory of Art I
- 3 - ART 209 Beginning Sculpture
- 3 - ART 211 Beginning Printmaking
- 3 - Computer Skills Requirement¹
- 4 - Science Requirement¹

16

Second Semester

- 3 - A A H 206 History and Theory of Art II
- 3 - ART 213 Beginning Photography
- 3 - ART 217 Beginning Ceramics
- 3 - ART 305 Drawing
- 4 - Science Requirement¹

16

Junior Year

First Semester

- 3 - A A H 305 Contemporary Art History
- 6 - ART 300/400 Requirement
- 3 - Studio Requirement²
- 3 - Writing Intensive Requirement¹
- 3 - Elective

18

Second Semester

- 6 - ART 300/400 Requirement
- 3 - Humanities Requirement E.1¹
- 3 - Oral Communication Requirement¹
- 3 - Studio Requirement²
- 3 - Elective

18

Senior Year

First Semester

- 5 - ART 472 BFA Senior Studio I
- 3 - ART 300/400 Requirement
- 3 - Social Science Requirement¹
- 3 - Studio Requirement²
- 3 - Elective

17

Second Semester

- 5 - ART 471 BFA Senior Studio II
- 3 - ART 300/400 Requirement
- 3 - Social Science Requirement¹
- 3 - Studio Requirement²
- 3 - Elective

17

134 Total Semester Hours

¹See General Education Requirements.

²All ART courses and other courses approved by the major advisor.

HISTORY

Bachelor of Arts

The recommended program consists of the required courses in the basic Bachelor of Arts curriculum, plus GEOG 103 or 306 (with consent of instructor) and 30 additional credits in history, including two courses at the 400 level, one of which must be HIST 490. Additional electives are added as needed to meet the minimum of 130 semester credits required for graduation.

Pre-law students majoring in History should consult the departmental advisor for a recommended program.

BASIC CURRICULUM

Freshman Year

First Semester

- 3 - ENGL 101 Composition I
- 3 - HIST 172 Western Civilization
- 3 - MTHSC 101 Introduction to Probability¹
- 4 - Foreign Language Requirement
- 4 - Science Requirement²

17

Second Semester

- 3 - ENGL 102 Composition II
- 3 - HIST 173 Western Civilization
- 3 - MTHSC 102 Intro. to Mathematical Analysis¹
- 4 - Foreign Language Requirement
- 4 - Science Requirement²

17

Sophomore Year

First Semester

- 3 - Computer Skills Requirement²
- 3 - Foreign Language Requirement
- 3 - Literature Requirement¹
- 9 - Major and Minor Areas

18

Second Semester

- 6 - Advanced Humanities Requirement⁴
- 3 - Foreign Language Requirement
- 3 - Literature Requirement¹
- 4 - Elective

16

Junior Year

First Semester

- 9 - Major and Minor Areas
- 3 - Writing Intensive Requirement²
- 3 - Elective

15

Second Semester

- 12 - Major and Minor Areas
- 3 - Oral Communication Requirement²

15

Senior Year

First Semester

- 6 - Advanced Humanities Requirement⁴
- 9 - Major and Minor Areas
- 2 - Elective

17

Second Semester

- 9 - Major and Minor Areas
- 6 - Elective

15

130 Total Semester Hours

¹Students may pursue alternate sequences such as the following: MTHSC 101 and 106 or 203; 102 and 207; or 106 and 108, 207, 301.

²See General Education Requirements.

³ENGL 202, 203, 204, 205, 206, 207, 208, 209, and H210.

⁴See advisor.

LANDSCAPE ARCHITECTURE

Bachelor of Landscape Architecture

As practicing design professionals, landscape architects base their land area design plans on very highly developed design standards and a keen awareness of the environmental and cultural context of the site. Landscape architects are active in the design of regional and city plans, urban designs, urban plazas, city parks and playgrounds, athletic fields, marinas, and other recreational areas. They design housing areas of all types, industrial and office parks, medical and academic campuses, parkways and bike ways, courtyards and backyards.

To succeed in landscape architecture, one must first be a "maker," someone who enjoys creating something new or recreating something old. He/she must also see the study of landscape architecture as a way to make the environment better through an enlightened application of design on the land.

The five-year program leads to the professional degree, Bachelor of Landscape Architecture. Students can use the professional support requirement to tailor the degree to an area of specialization such as construction, architecture, horticulture, business, etc. Following completion of the degree, most states require a two or three year work experience before taking the professional license examination.

Freshman Year

First Semester

- 3 - A A H 101 Survey of Art and Arch. History I
- 3 - DESIGN 151 Design Studies I
- 1 - DESIGN 153 Design Theory I
- 3 - ENGL 101 Composition I
- 3 - GEOL 101 Physical Geology¹
- 1 - GEOL 103 Physical Geology Lab.
- 3 - MTHSC 102 Intro. to Mathematical Analysis

17

Second Semester

- 3 - A A H 102 Survey of Art and Arch. History II
- 3 - DESIGN 152 Design Studies II
- 1 - DESIGN 154 Design Theory II
- 3 - ENGL 102 Composition II
- 3 - EX ST 301 Introductory Statistics²
- 3 - GEOL 112 Earth Resources¹
- 1 - GEOL 114 Earth Resources Lab.

1 - Elective

18

Sophomore Year

First Semester

- 3 - A A H 416 History of Landscape Architecture
- 2 - B E 221 Surveying for Soil and Water Res.
- 5 - DESIGN 251 Design Studies III
- 1 - DESIGN 253 Design Theory III
- 3 - HORT 101 Horticulture
- 3 - Humanities Requirement E.1³

17

Second Semester

- 3 - AG M 301 Soil and Water Conservation
- 5 - DESIGN 252 Design Studies IV
- 1 - DESIGN 254 Design Theory IV
- 3 - Computer Skills Requirement³
- 3 - Humanities Requirement E.2³
- 3 - Writing Intensive Requirement²

18

Junior Year

First Semester

- 3 - HORT 303 Plant Materials
- 6 - LARCH 351 Landscape Architecture Design I
- 3 - LARCH 362 Landscape Arch. Technology II
- 3 - Art Requirement⁴
- 3 - Social Science Requirement³

18

Second Semester

- 4 - HORT 461 Problems in Landscape Design
- 6 - LARCH 352 Landscape Arch. Design II
- 3 - Oral Communication Requirement³
- 3 - Social Science Requirement³
- 2 - Elective

18

Senior Year⁵

First Semester

- 6 - LARCH 451 Landscape Arch. Design III
- 3 - LARCH 462 Landscape Arch. Technology III
- 6 - Elective

15

Second Semester⁶

- 6 - LARCH 452 Landscape Arch. Design IV
- 3 - LARCH 581 Landscape Architectural Professional Practice
- 3 - Art Requirement⁴
- 3 - Elective

15

Professional Year⁷

First Semester

- 16 - Professional Support Requirement⁸

16

Second Semester

- 6 - LARCH 552 Professional Landscape Architectural Design
- 2 - LARCH 562 Landscape Arch. Technology IV
- 7 - Professional Support Requirement⁸

15

167 Total Semester Hours

¹BIOL 101 and 102; 103 and 104; PHYS 207 and 208; or CH 105 and 106 may be substituted.

²MTHSC 301 may be taken in lieu of EX ST 301.

³See General Education Requirements.

⁴Any 200, 300, 400 level ART course.

⁵Students may petition to graduate at the end of their senior year with a subprofessional BA or BS in Design degree. Students earning credit for four semesters of the same modern language may elect to receive the BA in Design. Note that only one degree in Design will be awarded.

⁶Exceptional students may be permitted to spend this semester at the Architecture Center in Charleston.

⁷Exceptional students may be permitted to spend this semester at the Daniel Center in Genoa, Italy.

⁸Select from approved departmental list or as approved in writing by advisor and department chair.

LANGUAGE AND INTERNATIONAL TRADE Bachelor of Arts

The Bachelor of Arts program in Language and International Trade helps students acquire a basic use of the four language skills (listening, reading, speaking, and writing); a familiarity with specific peoples, cultures, literatures, and business environments; and the knowledge and skills to pursue graduate studies or careers in business.

The program in Language and International Trade combines foreign languages and international trade. Students choose one language study area (French, German, Japanese, or Spanish) and one professional option (Applied International Economics, International Trade, Textiles, or Tourism).

A summer internship between the junior and senior years gives students the opportunity to apply classroom learning to a business/industrial work environment. Language and International Trade majors are also encouraged to participate in Study Abroad programs to increase language proficiency.

The language study area emphasizes speaking and writing skills, culture, civilization, and business/technical languages. The professional component emphasizes international marketing in areas important to the economy of the state and the nation.

In addition to the curriculum requirements outlined below, students will be required, as a condition of graduation, to pass a noncredit examination to determine their language competency. The examination will be taken in the student's last full semester at the University.

APPLIED INTERNATIONAL ECONOMICS OPTION

Freshman Year

First Semester

- 3 - CP SC 120 Issues in Computers
- 3 - ENGL 101 Composition I
- 4 - JAPN 101 Elementary Japanese¹
- 1 - L&IT 127 Intro. to Lang. and International Trade
- 3 - MTHSC 102 Intro. to Mathematical Analysis
- 4 - Science Requirement²

14-18

Second Semester

- 3 - ENGL 102 Composition II
- 4 - FR 102 Elementary French or
- 4 - GER 102 Elementary German or
- 4 - JAPN 102 Elementary Japanese or
- 4 - SPAN 102 Elementary Spanish
- 3 - HIST 172 Western Civilization
- 3 - MTHSC 207 Multivariable Calculus
- 4 - Science Requirement²

17

Sophomore Year

First Semester

- 3 - AP EC 202 Agricultural Economics
- 3 - FR 201 Intermediate French or
- 3 - GER 201 Intermediate German or
- 3 - JAPN 201 Intermediate Japanese or
- 3 - SPAN 201 Intermediate Spanish
- 3 - MKT 301 Principles of Marketing
- 3 - SPCH 251 Business and Professional Speaking
- 3 - Literature Requirement³
- 3 - Elective

18

Second Semester

- 3 - ACCT 203 Financial Accounting
- 3 - FR 202 Intermediate French or
- 3 - GER 202 Intermediate German or
- 3 - JAPN 202 Intermediate Japanese or
- 3 - SPAN 202 Intermediate Spanish
- 3 - GEOG 103 World Regional Geography
- 3 - HIST 173 Western Civilization
- 6 - Elective

18

Junior Year**First Semester**

- 3 - ECON 212 Principles of Macroeconomics
- 3 - ENGL 316 Writing and International Trade
- 3 - FR 305 Intermed. French Conv. and Comp. I or
 - 3 - GER 305 Inter. German Conv. and Comp. or
 - 3 - JAPN 305 Japanese Conv. and Comp. or
 - 3 - SPAN 305 Inter. Spanish Conv. and Comp. I
- 3 - Advanced Social Science Requirement¹
- 3 - Civilization Requirement²

15

Second Semester

- 3 - EX ST 462 Statistics Applied to Economics
- 3 - FR 316 French for International Trade I or
 - 3 - GER 316 German for Int. Trade I or
 - 3 - JAPN 316 Japanese for Int. Trade I or
 - 3 - SPAN 316 Spanish for International Trade I
- 3 - FR 411 Adv. French Conv. and Comp. or
 - 3 - GER 411 Studies in the German Lang. I or
 - 3 - JAPN 411 Studies in the Japanese Lang. I or
 - 3 - SPAN 411 Adv. Spanish Conv. and Comp.
- 3 - MKT 427 International Marketing
- 3 - Foreign Language 300/400-level Requirement⁶

15

Summer

- 3 - L&IT 400 L&IT Internship or
 - 3 - L&IT 401 L&IT Practicum

3

Senior Year**First Semester**

- 3 - AP EC 409 Commodity Futures Markets
- 3 - FR 416 French for International Trade II or
 - 3 - GER 416 German for Int. Trade II or
 - 3 - JAPN 416 Japanese for Int. Trade II or
 - 3 - SPAN 416 Spanish for Int. Trade II
- 3 - MKT 423 Promotional Strategy
- 3 - Foreign Language 300/400-level Requirement⁶
- 2 - Elective

14

Second Semester

- 3 - AP EC 420 World Agricultural Trade
- 3 - ECON 310 International Economy or
 - 3 - ECON 412 International Microeconomics
- 3 - Fine Arts Requirement⁷
- 3 - Foreign Language 300/400-level Requirement⁶
- 3 - Elective

15

129-133 Total Semester Hours

¹Students are expected to have completed the first semester of elementary language in high school or in a Clemson summer session before the first semester of the freshman year, except for Japanese.

²See General Education Requirements.

³ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.

⁴Twelve hours in social sciences are required at the 300-400 level. This includes agricultural and applied economics, anthropology, economics, geography, history, political science, psychology, and sociology.

⁵To be selected from FR, JAPN, or SPAN 307; or FR, GER, JAPN, or SPAN 308; or GER 413; or SPAN 435.

⁶A minimum of nine hours of 300-400-level foreign language courses is required. At least one course must be in literature. Advanced grammar is recommended for those exempting 100/200 levels.

⁷Three credits from art and architectural history, music, or theatre (practices with the approval of the department chair).

**INTERNATIONAL TRADE
OPTION****Freshman Year****First Semester**

- 3 - CP SC 120 Issues in Computers
- 3 - ENGL 101 Composition I
- 4 - JAPN 101 Elementary Japanese¹
- 1 - L&IT 127 Intro. to Lang. and International Trade
- 3 - MTHSC 102 Intro. to Mathematical Analysis
- 4 - Science Requirement²

14-18

Second Semester

- 3 - ENGL 102 Composition II
- 4 - FR 102 Elementary French or
 - 4 - GER 102 Elementary German or
 - 4 - JAPN 102 Elementary Japanese or
 - 4 - SPAN 102 Elementary Spanish
- 3 - HIST 172 Western Civilization
- 3 - MTHSC 207 Multivariable Calculus
- 4 - Science Requirement²

17

Sophomore Year**First Semester**

- 3 - ECON 211 Principles of Microeconomics
- 3 - FR 201 Intermediate French or
 - 3 - GER 201 Intermediate German or
 - 3 - JAPN 201 Intermediate Japanese or
 - 3 - SPAN 201 Intermediate Spanish
- 3 - HIST 173 Western Civilization
- 3 - SPCH 251 Business and Professional Speaking
- 3 - Literature Requirement³
- 3 - Advanced Social Science Requirement⁴

18

Second Semester

- 3 - ACCT 203 Financial Accounting
- 3 - FR 202 Intermediate French or
 - 3 - GER 202 Intermediate German or
 - 3 - JAPN 202 Intermediate Japanese or
 - 3 - SPAN 202 Intermediate Spanish
- 3 - LAW 322 Legal Environment of Business
- 3 - MKT 301 Principles of Marketing
- 3 - Advanced Social Science Requirement⁴

15

Junior Year**First Semester**

- 3 - ECON 310 International Economy or
 - 3 - ECON 412 International Microeconomics
- 3 - ENGL 316 Writing and International Trade
- 3 - FR 305 Intermed. French Conv. and Comp. I or
 - 3 - GER 305 Inter. German Conv. and Comp. or
 - 3 - JAPN 305 Japanese Conv. and Comp. or
 - 3 - SPAN 305 Inter. Spanish Conv. and Comp. I
- 3 - Civilization Requirement⁵
- 3 - Elective

15

Second Semester

- 3 - FR 316 French for International Trade I or
 - 3 - GER 316 German for Int. Trade I or
 - 3 - JAPN 316 Japanese for Int. Trade I or
 - 3 - SPAN 316 Spanish for International Trade I

- 3 - FR 411 Adv. French Conv. and Comp. or
 - 3 - GER 411 Studies in the German Lang. I or
 - 3 - JAPN 411 Studies in the Japanese Lang. I or
 - 3 - SPAN 411 Adv. Spanish Conv. and Comp.
- 3 - MKT 427 International Marketing
- 3 - MTHSC 301 Statistical Theory and Methods I
- 3 - Foreign Language 300/400-level Requirement⁶
- 3 - Elective

18

Summer

- 3 - L&IT 400 L&IT Internship or
 - 3 - L&IT 401 L&IT Practicum

3

Senior Year**First Semester**

- 3 - FIN 306 Corporation Finance
- 3 - FR 416 French for International Trade II or
 - 3 - GER 416 German for Int. Trade II or
 - 3 - JAPN 416 Japanese for Int. Trade II or
 - 3 - SPAN 416 Spanish for Int. Trade II
- 3 - MGT 301 Principles of Management
- 3 - Foreign Language 300/400-level Requirement⁶
- 3 - Advanced Social Science Requirement⁴

15

Second Semester

- 3 - MGT 418 Management Information Systems
- 3 - MGT 424 International Transportation and Logistics
- 3 - Fine Arts Requirement⁷
- 3 - Foreign Language 300/400-level Requirement⁶
- 6 - Elective

18

133-137 Total Semester Hours

¹Students are expected to have completed the first semester of elementary language in high school or in a Clemson summer session before the first semester of the freshman year, except for Japanese.

²See General Education Requirements.

³ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.

⁴Twelve hours in social sciences are required at the 300-400 level. This includes agricultural and applied economics, anthropology, economics, geography, history, political science, psychology, and sociology.

⁵To be selected from FR, JAPN, or SPAN 307; or FR, GER, JAPN, or SPAN 308; or GER 413; or SPAN 435.

⁶A minimum of nine hours of 300-400-level foreign language courses is required. At least one course must be in literature. Advanced grammar is recommended for those exempting 100/200 levels.

⁷Three credits from art and architectural history, music, or theatre (practices with the approval of the department chair).

TEXTILES OPTION**Freshman Year****First Semester**

- 3 - CP SC 120 Issues in Computers
- 3 - ENGL 101 Composition I
- 4 - JAPN 101 Elementary Japanese¹
- 1 - L&IT 127 Intro. to Lang. and International Trade
- 3 - MTHSC 102 Intro. to Mathematical Analysis
- 4 - Science Requirement²

14-18

Second Semester

- 3 - ENGL 102 Composition II
- 4 - FR 102 Elementary French *or*
- 4 - GER 102 Elementary German *or*
- 4 - JAPN 102 Elementary Japanese *or*
- 4 - SPAN 102 Elementary Spanish
- 3 - HIST 172 Western Civilization
- 3 - MTHSC 207 Multivariable Calculus
- 4 - Science Requirement²

17

Sophomore Year**First Semester**

- 3 - FR 201 Intermediate French *or*
- 3 - GER 201 Intermediate German *or*
- 3 - JAPN 201 Intermediate Japanese *or*
- 3 - SPAN 201 Intermediate Spanish
- 3 - MKT 301 Principles of Marketing
- 3 - SPCH 251 Business and Professional Speaking
- 3 - TEXT 460 Textile Processes
- 3 - Literature Requirement³
- 3 - Elective

18

Second Semester

- 3 - FR 202 Intermediate French *or*
- 3 - GER 202 Intermediate German *or*
- 3 - JAPN 202 Intermediate Japanese *or*
- 3 - SPAN 202 Intermediate Spanish
- 3 - HIST 173 Western Civilization
- 3 - MKT 427 International Marketing
- 6 - Advanced Social Science Requirement⁴
- 3 - Elective

18

Junior Year**First Semester**

- 3 - ECON 211 Principles of Microeconomics *or*
- 3 - ECON 212 Principles of Macroeconomics
- 3 - ENGL 316 Writing and International Trade
- 3 - FR 305 Intermed. French Conv. and Comp. I *or*
- 3 - GER 305 Inter. German Conv. and Comp. *or*
- 3 - JAPN 305 Japanese Conv. and Comp. *or*
- 3 - SPAN 305 Inter. Spanish Conv. and Comp. I
- 4 - TEXT 314 Chemical Processing of Textiles
- 3 - Civilization Requirement⁵

16

Second Semester

- 3 - FR 316 French for International Trade I *or*
- 3 - GER 316 German for Int. Trade I *or*
- 3 - JAPN 316 Japanese for Int. Trade I *or*
- 3 - SPAN 316 Spanish for International Trade I
- 3 - FR 411 Adv. French Conv. and Comp. *or*
- 3 - GER 411 Studies in the German Lang. I *or*
- 3 - JAPN 411 Studies in the Japanese Lang. I *or*
- 3 - SPAN 411 Adv. Spanish Conv. and Comp.
- 4 - TEXT 308 Apparel
- 3 - Foreign Language 300/400-level Requirement⁶
- 3 - Elective

16

Summer

- 3 - L&IT 400 L&IT Internship *or*
- 3 - L&IT 401 L&IT Practicum

3

Senior Year**First Semester**

- 3 - FR 416 French for International Trade II *or*
- 3 - GER 416 German for Int. Trade II *or*
- 3 - JAPN 416 Japanese for Int. Trade II *or*
- 3 - SPAN 416 Spanish for Int. Trade II
- 3 - MKT 423 Promotional Strategy
- 3 - TEXT 422 Properties of Textile Structures
- 3 - Foreign Language 300/400-level Requirement⁶
- 3 - Advanced Social Science Requirement⁴

15

Second Semester

- 3 - ECON 310 International Economy *or*
- 3 - ECON 412 International Microeconomics
- 3 - TEXT 475 Textile Marketing
- 3 - Fine Arts Requirement⁷
- 3 - Foreign Language 300/400-level Requirement⁶
- 4 - Elective

16

133-137 Total Semester Hours

¹Students are expected to have completed the first semester of elementary language in high school or in a Clemson summer session before the first semester of the freshman year, except for Japanese.

²See General Education Requirements.

³ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.

⁴Twelve hours in social sciences are required at the 300-400 level. This includes agricultural and applied economics, anthropology, economics, geography, history, political science, psychology, and sociology.

⁵To be selected from FR, JAPN, or SPAN 307; or FR, GER, JAPN, or SPAN 308; or GER 413; or SPAN 435.

⁶A minimum of nine hours of 300-400-level foreign language courses is required. At least one course must be in literature. Advanced grammar is recommended for those exempting 100/200 levels.

⁷Three credits from art and architectural history, music, or theatre (practica with the approval of the department chair).

TOURISM OPTION**Freshman Year****First Semester**

- 3 - CP SC 120 Issues in Computers
- 3 - ENGL 101 Composition I
- 4 - JAPN 101 Elementary Japanese¹
- 1 - L&IT 127 Intro. to Lang. and International Trade
- 3 - MTHSC 102 Intro. to Mathematical Analysis
- 4 - Science Requirement²

14-18

Second Semester

- 3 - ENGL 102 Composition II
- 4 - FR 102 Elementary French *or*
- 4 - GER 102 Elementary German *or*
- 4 - JAPN 102 Elementary Japanese *or*
- 4 - SPAN 102 Elementary Spanish
- 3 - HIST 172 Western Civilization
- 3 - MTHSC 207 Multivariable Calculus
- 4 - Science Requirement²

17

Sophomore Year**First Semester**

- 3 - FR 201 Intermediate French *or*
- 3 - GER 201 Intermediate German *or*
- 3 - JAPN 201 Intermediate Japanese *or*
- 3 - SPAN 201 Intermediate Spanish
- 3 - MKT 301 Principles of Marketing

- 3 - PRTM 342 Introduction to Tourism
- 3 - SPCH 251 Business and Professional Speaking
- 3 - Literature Requirement³
- 3 - Elective

18

Second Semester

- 3 - FR 202 Intermediate French *or*
- 3 - GER 202 Intermediate German *or*
- 3 - JAPN 202 Intermediate Japanese *or*
- 3 - SPAN 202 Intermediate Spanish
- 3 - HIST 173 Western Civilization
- 3 - MKT 427 International Marketing
- 6 - Advanced Social Science Requirement⁴
- 3 - Elective

18

Junior Year**First Semester**

- 3 - ECON 211 Principles of Microeconomics
- 3 - ENGL 316 Writing and International Trade
- 3 - FR 305 Intermed. French Conv. and Comp. I *or*
- 3 - GER 305 Inter. German Conv. and Comp. *or*
- 3 - JAPN 305 Japanese Conv. and Comp. *or*
- 3 - SPAN 305 Inter. Spanish Conv. and Comp. I
- 3 - PRTM 343 Spatial Aspects of Tourist Behavior
- 3 - Civilization Requirement⁵

15

Second Semester

- 3 - FR 316 French for International Trade I *or*
- 3 - GER 316 German for Int. Trade I *or*
- 3 - JAPN 316 Japanese for Int. Trade I *or*
- 3 - SPAN 316 Spanish for International Trade I
- 3 - FR 411 Adv. French Conv. and Comp. *or*
- 3 - GER 411 Studies in the German Lang. I *or*
- 3 - JAPN 411 Studies in the Japanese Lang. I *or*
- 3 - SPAN 411 Adv. Spanish Conv. and Comp.
- 3 - Foreign Language 300/400-level Requirement⁶
- 3 - PRTM 300/400-level Requirement⁷
- 3 - Elective

15

Summer

- 3 - L&IT 400 L&IT Internship *or*
- 3 - L&IT 401 L&IT Practicum

3

Senior Year**First Semester**

- 3 - FR 416 French for International Trade II *or*
- 3 - GER 416 German for Int. Trade II *or*
- 3 - JAPN 416 Japanese for Int. Trade II *or*
- 3 - SPAN 416 Spanish for Int. Trade II
- 3 - MKT 423 Promotional Strategy
- 3 - PRTM 444 Tour Planning and Operations
- 3 - Advanced Social Science Requirement⁴
- 3 - Foreign Language 300/400-level Requirement⁶

15

Second Semester

- 3 - ECON 310 International Economy *or*
- 3 - ECON 412 International Microeconomics
- 3 - PRTM 447 Perspectives on International Travel
- 3 - Fine Arts Requirement⁸
- 3 - Foreign Language 300/400-level Requirement⁶
- 6 - Elective

18

133-137 Total Semester Hours

¹Students are expected to have completed the first semester of elementary language in high school or in a Clemson summer session before the first semester of the freshman year, except for Japanese.

²See General Education Requirements.

³ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.

⁴Twelve hours in social sciences are required at the 300–400 level. This includes agricultural and applied economics, anthropology, economics, geography, history, political science, psychology, and sociology.

⁵To be selected from FR, JAPN, or SPAN 307; or FR, GER, JAPN, or SPAN 308; or GER 413; or SPAN 435.

⁶A minimum of nine hours of 300–400-level foreign language courses is required. At least one course must be in literature. Advanced grammar is recommended for those exempting 100/200 levels.

⁷Three credits in PRTM at the 300–400 level, approved by the Language and International Trade Director.

⁸Three credits from art and architectural history, music, or theatre (practica with the approval of the department chair).

MODERN LANGUAGES

Bachelor of Arts

The Bachelor of Arts degree in Modern Languages helps students acquire a basic use of the four language skills (listening, reading, speaking, and writing); a familiarity with specific peoples, cultures, and literatures; and the knowledge and foreign-language skills to pursue graduate studies or careers in education or business. All Modern Language majors are encouraged to travel/study abroad.

A student may elect a major concentration in a single language, a double major in two languages, or a double major combining a language major with a Bachelor of Arts major outside the department. All Modern Language majors must complete the courses stipulated in the basic curriculum.

French—Requires FR 305 and 309 plus 24 additional credits in French at the 300–400. Six credits of literature courses, three credits of which must be at the 400 level, are required.

German—Requires 24 credits in German at the 300–400-level.

Spanish—Requires 30 credits at the 300–400 levels, of which nine hours must be at the 400 level. A minimum of six hours of literature, including one course at the 400 level, is also required.

As a condition of graduation, students are required to pass a noncredit examination to determine their proficiency in the area. This examination is taken in the student's last full semester at the University.

BASIC CURRICULUM

Freshman Year

First Semester

- 3 - ENGL 101 Composition I
- 3 - HIST 172 Western Civilization
- 3 - MTHSC 101 Introduction to Probability¹
- 4 - Foreign Language Requirement
- 4 - Science Requirement²

17

Second Semester

- 3 - ENGL 102 Composition II
- 3 - HIST 173 Western Civilization
- 3 - MTHSC 102 Intro. to Mathematical Analysis¹
- 4 - Foreign Language Requirement
- 4 - Science Requirement²

17

Sophomore Year

First Semester

- 3 - Computer Skills Requirement²
- 3 - Fine Arts Requirement³
- 3 - Foreign Language Requirement
- 3 - Literature Requirement⁴
- 6 - Elective

18

Second Semester

- 3 - Foreign Language Requirement
- 3 - Literature Requirement⁴
- 10 - Elective

16

Junior Year

First Semester

- 9 - Major and Minor Areas
- 3 - Oral Communication Requirement²
- 3 - Elective

15

Second Semester

- 12 - Major and Minor Areas
- 3 - Writing Intensive Requirement²

15

Senior Year

First Semester

- 9 - Major and Minor Areas
- 8 - Elective

17

Second Semester

- 9 - Major and Minor Areas
- 6 - Elective

15

130 Total Semester Hours

¹Students may pursue alternate sequences such as the following: MTHSC 101 and 106 or 203; 102 and 207; or 106 and 108, 207, 301.

²See General Education Requirements.

³Three credits from art and architectural history, music, or theatre (practica with the approval of the department chair).

⁴ENGL 202, 203, 204, 205, 206, 207, 208, 209, and H210.

PHILOSOPHY

Bachelor of Arts

The required course of study consists of the Basic Curriculum and either the standard philosophy major or the philosophy major with a concentration in religious studies.

The standard philosophy major consists of PHIL 315, 316, 401 or 402, and 24 additional credits in philosophy selected with the advice and consent of a departmental advisor; three of these 24 credits may be at the 100 level. Additional electives are added as needed to meet the minimum of 130 semester credits required for graduation.

The philosophy major with a concentration in religious studies consists of REL 101 or 102, 301, 302, 401 or 402, PHIL 303, 315, 316, 401 or 402, and nine additional credits selected with the advice and consent of a departmental advisor. Of these nine credits, three must be in philosophy and three must be in religion at the 300 level or above. The remaining three credits may be in either religion or philosophy but must be at the 300 level or above. Students with this concentration must choose a minor other than religion. Additional electives are added as needed to meet the minimum of 130 semester credits required for graduation.

Pre-law and Pre-med students majoring in Philosophy should consult the departmental advisor for help in tailoring the program to their needs.

BASIC CURRICULUM

Freshman Year

First Semester

- 3 - ENGL 101 Composition I
- 3 - HIST 172 Western Civilization
- 3 - MTHSC 101 Introduction to Probability¹
- 4 - Foreign Language Requirement
- 4 - Science Requirement²

17

Second Semester

- 3 - ENGL 102 Composition II
- 3 - HIST 173 Western Civilization
- 3 - MTHSC 102 Intro. to Mathematical Analysis¹
- 4 - Foreign Language Requirement
- 4 - Science Requirement²

17

Sophomore Year

First Semester

- 3 - Foreign Language Requirement
- 3 - Literature Requirement³
- 9 - Major and Minor Areas
- 3 - Oral Communication Requirement²

18

Second Semester

- 3 - Computer Skills Requirement²
- 3 - Foreign Language Requirement
- 3 - Literature Requirement³
- 7 - Elective

16

Junior Year**First Semester**

- 9 - Major and Minor Areas
 - 3 - Writing Intensive Requirement²
 - 3 - Elective
-
- 15

Second Semester

- 12 - Major and Minor Areas
 - 3 - Elective
-
- 15

Senior Year**First Semester**

- 6 - Advanced Social Sciences Requirement⁴
 - 11 - Major and Minor Areas
-
- 17

Second Semester

- 6 - Advanced Social Sciences Requirement⁴
 - 9 - Major and Minor Areas
-
- 15

130 Total Semester Hours

¹Students may pursue alternate sequences such as the following: MTHSC 101 and 106 or 203; 102 and 207; or 106 and 108, 207, or 301.

²See General Education Requirements.

³ENGL 202, 203, 204, 205, 206, 207, 208, 209, and H210.

⁴See advisor.

SPEECH AND COMMUNICATION STUDIES

Bachelor of Arts

The Bachelor of Arts in Speech and Communication Studies is designed to provide a thoroughly integrated yet individual degree program that will prepare students for careers in business, government, and public sectors. In addition, the program provides a foundation for graduates who wish to pursue advanced degrees in the humanities, social sciences, business, and law. Speech and Communication Studies examines communication in a variety of contexts. Students will select an area of concentration that is germane to individual career interests: Organizational Studies, Media Studies, or Relational/Cultural Studies.

SPCH 150 is required of all Speech and Communication Studies majors.

I. Speech and Communication Core Courses (18 hours)

- SPCH 250 Public Speaking *or*
- SPCH 251 Business and Prof. Speaking
- SPCH 301 Speech Communication Theories
- SPCH 302 Mass Communication Theory
- SPCH 310 Communication Research Methods
- SPCH (ENGL) 491 Classical Rhetoric *or*
- SPCH (ENGL) 492 Modern Rhetoric
- SPCH 495 Senior Communication Thesis

II. Speech and Communication Concentrations of Study (12 hours)

Organizational Studies—SPCH 364, 464 plus two courses from the following: SPCH 340, 362, 460.

Media Studies—SPCH 300, 365 plus two courses from the following: ENGL 357, SPCH 320, 480.

Relational/Cultural Studies—SPCH 348, 480 plus two courses from the following: SPCH 330, 350, 455.

III. Speech and Communication General Requirements (6 hours)

Any 300- or 400-level speech course. Additional courses taken under a concentration of study may also be used to fulfill this requirement.

36 total hours

Advanced Social Science Requirement (12 hours)

Electives as needed to complete 130 hours

BASIC CURRICULUM**Freshman Year****First Semester**

- 3 - ENGL 101 Composition I
 - 3 - HIST 172 Western Civilization
 - 4 - Foreign Language Requirement
 - 3 - Mathematical Sciences Requirement¹
 - 4 - Science Requirement¹
-
- 17

Second Semester

- 3 - ENGL 102 Composition II
 - 3 - HIST 173 Western Civilization
 - 4 - Foreign Language Requirement
 - 3 - Mathematical Sciences Requirement¹
 - 4 - Science Requirement¹
-
- 17

Sophomore Year**First Semester**

- 3 - SPCH 150 Intro. to Speech Communication
 - 3 - Computer Skills Requirement¹
 - 3 - Foreign Language Requirement
 - 3 - Literature Requirement²
 - 6 - Elective
-
- 18

Second Semester

- 3 - Advanced Social Science Requirement¹
 - 3 - Foreign Language Requirement
 - 3 - Literature Requirement²
 - 6 - Major and Minor Areas
 - 1 - Elective
-
- 16

Junior Year**First Semester**

- 3 - Advanced Social Science Requirement¹
 - 9 - Major and Minor Areas
 - 3 - Writing Intensive Requirement¹
-
- 15

Second Semester

- 15 - Major and Minor Areas
-
- 15

Senior Year**First Semester**

- 3 - Advanced Social Science Requirement¹
 - 12 - Major and Minor Areas
 - 2 - Elective
-
- 17

Second Semester

- 3 - Advanced Social Science Requirement¹
 - 9 - Major and Minor Areas
 - 3 - Elective
-
- 15

130 Total Semester Hours

¹See General Education Requirements.

²ENGL 202, 203, 204, 205, 206, 207, 208, 209, and H210.

³See advisor.

Note: Students requesting a transfer into the Speech and Communication Studies program with fewer than 50 hours must have a GPR of 2.3 or higher. Students requesting a transfer into the Speech and Communication Studies program with 50 hours or more must have a GPR of 2.5 or higher.

COLLEGE OF BUSINESS AND PUBLIC AFFAIRS

The College of Business and Public Affairs includes the following academic programs: the School of Accountancy and Legal Studies; the School of Business and Leadership which includes the Departments of Aerospace Studies, Economics, Finance, Graphic Communications, Management, Marketing, Military Science, and the MBA Program; and the School of Social Science which contains the Departments of Political Science, Psychology, and Sociology.

The mission of the College of Business and Public Affairs is

- to develop leaders who are exceptionally qualified, globally competitive, entrepreneurial spirited, and committed to the betterment of society,
- to produce scholarly research that is relevant to our stakeholders, and
- to support professional and public service activities that contribute to economic, social, and intellectual development.

SCHOOL OF BUSINESS AND LEADERSHIP

The School of Business and Leadership strives to be a preferred learning-centered organization, educating men and women as leaders in business and the military and expanding their knowledge in the business fields.

The programs of the School of Business and Leadership embrace three major areas: teaching, research, and public service. The School is responsible for seven graduate degree programs, eight undergraduate degree programs, ROTC programs in Military Science and Aerospace Studies, as well as a series of professional development courses for business and industry. The undergraduate curricula are in Accounting, Economics, Financial Management, Graphic Communications, Industrial Management, Management, and Marketing. The degrees in Accounting, Financial Management, Industrial Management, Management, and Marketing share a common curriculum the first two years, allowing the student maximum flexibility in choosing the appropriate major; these degrees are accredited by the American Assembly of Collegiate Schools of Business. The curricula prepare students for a variety of careers and furnish an education that recognizes the need for an understanding of the basic principles of science, appreciation for the nature of human interaction, and the comprehension of the economic, political, and social environment. Secondary concentrations and minors allow flexibility for selection of courses and emphasis areas.

Aerospace Studies (AFROTC)

Air Force Reserve Officer Training Corps provides students the opportunity to earn a commission as second lieutenants while pursuing a bachelor's degree. The program includes courses in air power history, written and oral communications, leader-

ship and management, and political science. Air Force ROTC is designed to meet the need for dedicated and professional leaders in the active duty Air Force. Additional information is available from the Department of Aerospace Studies.

Military Science (Army ROTC)

The requirements for a commission in the U.S. Army are established by U.S. law and the Department of the Army. The legal and regulatory requirements are available at the Military Science Department. In addition to the Military Science curricula, all candidates for commissioning must successfully complete three credits of military history as approved by the professor of military science. Further information may be obtained from the Military Science Department.

ACCOUNTING

Bachelor of Science

The program leading to the Bachelor of Science degree in Accounting is designed to prepare students for careers as professional accountants. Students completing this program are well prepared to enter many accounting career fields in industry. Students are also well prepared to continue their study at the graduate level.

Students planning to enter the public accounting profession and become Certified Public Accountants should note that the requirements to sit for the CPA examination in South Carolina include 150 hours of collegiate education and completion of a bachelor's degree. Other states have, or will soon have, similar requirements. The faculty of the School of Accountancy and Legal Studies believes these requirements are best met with a bachelor's degree in accounting and completion of the Master of Professional Accountancy (MPAcc) degree program. The MPAcc program also enhances the preparation of students pursuing accounting careers in other areas of specialization such as internal auditing, managerial accounting, and taxation.

Admission to the MPAcc program is separate from admission to the undergraduate program. It is based on the student's undergraduate record and score on the Graduate Management Admissions Test (GMAT). For information on the MPAcc program, contact the School of Accountancy, 301 Sirrine Hall.

In addition to accounting and business courses, approximately one-half of the Bachelor of Science curriculum is devoted to English and public speaking, mathematics, natural and social sciences, and the humanities. Thus, students in the accounting program obtain a broad-based education that not only gives them accounting expertise but also contributes to their proficiency in analytical, communication, and interpersonal skills. Along with the general business accreditation held by the School of Business and Leadership, the degree programs offered by the School of Accountancy and Legal Studies are separately accredited by the American Assembly of Collegiate Schools of Business.

Freshman Year

First Semester

- 1 - BUS 101 Business Foundations
- 3 - ENGL 101 Composition I
- 3 - HIST 173 Western Civilization
- 3 - MTHSC 102 Intro. to Mathematical Analysis
- 3 - PHIL 102 Introduction to Logic
- 4 - Science Requirement¹

17

Second Semester

- 3 - CP SC 120 Issues in Computers
- 3 - ENGL 102 Composition II
- 3 - MTHSC 207 Multivariable Calculus
- 3 - PSYCH 201 Introduction to Psychology or
- 3 - SOC 201 Introduction to Sociology
- 4 - Science Requirement¹

16

Sophomore Year

First Semester

- 3 - ACCT 201 Accounting Concepts I
- 3 - ECON 211 Principles of Microeconomics
- 3 - EX ST 301 Introductory Statistics or
- 3 - MTHSC 301 Statistical Theory and Meth.
- 3 - SPCH 250 Public Speaking or
- 3 - SPCH 251 Business and Prof. Speaking
- 3 - International Requirement²
- 1 - Elective³

16

Second Semester

- 3 - ACCT 202 Accounting Concepts II
- 1 - ACCT 204 Accounting Procedures
- 3 - CP SC 220 Microcomputer Applications
- 3 - ECON 212 Principles of Macroeconomics
- 3 - International Requirement²
- 3 - Literature Requirement⁴
- 1 - Elective³

17

Junior Year

First Semester

- 3 - ACCT 301 Intermediate Accounting I
- 3 - ACCT 322 Accounting Information Systems
- 3 - ENGL 304 Business Writing
- 3 - FIN 311 Financial Management I
- 3 - MGT 301 Principles of Management

15

Second Semester

- 3 - ACCT 302 Intermediate Accounting II
- 3 - ACCT 340 Internal Auditing Theory⁵ or
- 3 - ACCT 415 Auditing⁵
- 3 - FIN 312 Financial Management II
- 3 - MA SC 312 Decision Models for Management
- 3 - MKT 301 Principles of Marketing

15

Senior Year

First Semester

- 3 - ACCT 303 Cost Accounting
- 3 - LAW 312 Commercial Law
- 3 - PHIL 344 Business Ethics
- 3 - Fine Arts Requirement⁶
- 3 - Elective³

15

Second Semester

- 3 - ACCT 404 Individual Taxation¹ or
3 - ACCT 406 Business Taxation¹
- 3 - ACCT 410 Budgeting and Executive Control
- 3 - LAW 313 Commercial Law
- 3 - MGT 415 Business Strategy
- 5 - Elective¹

17
128 Total Semester Hours¹See General Education Requirements.

²Either complete a two-semester foreign language sequence (level to be determined through placement and advising) or complete six hours of coursework on the geography, history, literature, religion, arts, or political or cultural environment of a nation or region other than the United States. A list of approved courses is available through advising. If an eight-hour elementary language sequence is approved, then elective credits are used to satisfy the difference in hours.

³Elective credits may be taken in any combination of 1-, 2-, 3-, or 4-hour courses, but see footnote 2 above.

⁴Choose from sophomore literature courses (200 level only) or foreign language literature courses (300 level or above).

⁵Students planning to pursue the Master of Professional Accountancy degree program should take ACCT 404 and 415.

⁶To be selected from one of the following courses: A H 210, MUSIC 210, or THEA 210.

Notes:

1. Failure to follow the semester and sequencing recommendations may jeopardize the student's ability to complete degree requirements within eight semesters.

2. Students must earn a C in all prerequisite accounting courses before enrolling in the next level accounting course. Courses for which this rule applies are ACCT 201, 202, 204, 301, 303 and 340.

3. At least 50 percent of the total credits taken in ACCT, ECON, FIN, LAW, MGT, MA SC, and MKT must be taken at Clemson University.

ECONOMICS

A bachelor's degree in Economics provides a thorough understanding of the economic system and prepares students for a wide range of careers. By combining general education courses, a minor or study area, and a strong major in economics, students can prepare for specialized graduate studies and careers in business and government.

The Department of Economics offers two undergraduate degree paths. The Bachelor of Arts degree is distinguished by its emphasis on language skills and humanities. A broad choice of minors is available for this program. The Bachelor of Science program emphasizes quantitative skills and preparation for careers in business, law, or graduate study in economics. Both programs require 30 credits of coursework in economics which may be satisfied by completing ECON 211, 212, and 24 credits of coursework above the sophomore level or by completing either ECON 200 or 201 and 27 credits above the sophomore level. Bachelor of Arts majors must complete ECON 314 and 315. Bachelor of Science majors must complete ECON 405 in addition to 314 and 315.

Bachelor of Arts**Freshman Year****First Semester**

- 3 - CP SC 120 Issues in Computers
- 3 - ENGL 101 Composition I
- 3 - MTHSC 102 Intro. to Mathematical Analysis¹
- 4 - Foreign Language Requirement²
- 4 - Science Requirement³

17

Second Semester

- 3 - ENGL 102 Composition II
- 3 - HIST 173 Western Civilization
- 3 - MTHSC 207 Multivariable Calculus¹
- 4 - Foreign Language Requirement²
- 4 - Science Requirement³

17

Sophomore Year**First Semester**

- 3 - ECON 211 Principles of Microeconomics
- 3 - MTHSC 301 Statistical Theory and Methods¹
- 3 - Foreign Language Requirement²
- 3 - Literature Requirement⁴
- 4 - Elective

16

Second Semester

- 3 - ECON 212 Principles of Macroeconomics
- 3 - Foreign Language Requirement²
- 3 - Literature Requirement⁴
- 7 - Elective

16

Junior Year**First Semester**

- 3 - ECON 314 Intermediate Microeconomics
- 3 - SPCH 250 Public Speaking or
3 - SPCH 251 Business and Prof. Speaking
- 3 - Major Requirement⁵
- 3 - Minor
- 3 - Writing Intensive Requirement⁶
- 1 - Elective

16

Second Semester

- 3 - ECON 315 Intermediate Macroeconomics
- 3 - Major Requirement⁵
- 6 - Minor
- 4 - Elective

16

Senior Year**First Semester**

- 3 - Major Requirement⁵
- 6 - Minor
- 3 - Elective

15

Second Semester

- 6 - Major Requirement⁵
- 9 - Elective

15

128 Total Semester Hours

¹The sequence MTHSC 102, 207, and 301 may be replaced by MTHSC 106, 108, and 301.

²Two years of the same modern language are required.

³Two courses, totaling eight hours, in the same science.

⁴ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.

⁵ECON 301, 302, 306, and 310 cannot be used to satisfy Major Requirement.

⁶See General Education Requirements.

Note: Students seeking teaching certification will be required to complete more than 128 semester hours.

Minor Concentration

Any minor in liberal arts including the Cluster minor and any minor offered by any other department in the School of Business is acceptable as a minor for the Bachelor of Arts curriculum in Economics.

Students who wish to combine the curriculum in Economics with secondary school teaching should take the degree in Education with a teaching area in Economics. The courses will be those required for teaching certification as specified by the South Carolina Department of Education as well as those required for an Economics major. Requirements for a major in Education with a teaching area in Social Sciences are shown on page 96.

A minor in Economics is provided for other degree programs consisting of 15 credits above the sophomore level which must include ECON 314 and 315.

Bachelor of Science**Freshman Year****First Semester**

- 1 - BUS 101 Business Foundations
- 3 - ENGL 101 Composition I
- 3 - HIST 173 Western Civilization II
- 3 - MTHSC 102 Intro. to Mathematical Analysis¹
- 3 - PHIL 102 Introduction to Logic
- 4 - Science Requirement²

17

Second Semester

- 3 - CP SC 120 Issues in Computers
- 3 - ENGL 102 Composition II
- 3 - MTHSC 207 Multivariable Calculus¹
- 3 - PSYCH 301 Introduction to Psychology or
3 - SOC 201 Introduction to Sociology
- 4 - Science Requirement²
- 1 - Elective

17

Sophomore Year**First Semester**

- 3 - ACCT 201 Accounting Concepts I
- 3 - ECON 211 Principles of Microeconomics
- 3 - MTHSC 301 Statistical Theory and Methods¹
- 3 - SPCH 250 Public Speaking or
3 - SPCH 251 Business and Prof. Speaking
- 3 - International Requirement⁴
- 1 - Elective

16

Second Semester

- 3 - ACCT 202 Accounting Concepts II
- 3 - ECON 212 Principles of Macroeconomics
- 3 - International Requirement⁴
- 3 - Literature Requirement⁵
- 3 - Writing Intensive Requirement⁶
- 1 - Elective

16

Junior Year**First Semester**

- 3 - ECON 314 Intermediate Microeconomics
 - 3 - FIN 306 Corporate Finance⁷
 - 3 - Study Area⁸
 - 7 - Elective
-
- 16

Second Semester

- 3 - ECON 315 Intermediate Macroeconomics
 - 3 - ECON 405 Introduction to Econometrics
 - 3 - Major Requirement⁹
 - 3 - Study Area⁸
 - 4 - Elective
-
- 16

Senior Year**First Semester**

- 6 - Major Requirement⁹
 - 6 - Study Area⁸
 - 3 - Elective
-
- 15

Second Semester

- 6 - Major Requirement⁹
 - 9 - Study Area⁸
-
- 15

128 Total Semester Hours

⁷The sequence of MTHSC 102, 207, and 301 may be replaced by MTHSC 106, 108, and 301. Students who plan to take study area courses in Mathematical and Management Sciences should take MTHSC 206 as well.

⁸Two courses totaling eight credits in the same science are required.

⁹Either complete a two-semester modern foreign language sequence (level to be determined through advising) or complete six hours of coursework relating to the culture, geography, history, literature, politics, or economics of a nation other than the United States. An approved list of courses is available through advising.

⁹Economics majors who take an economics course on the approved list for the International Requirement cannot also count the course for major credit.

⁹ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.

⁹See General Education Requirements.

⁹Students who plan to take study area courses in finance may take FIN 311 in lieu of 306.

⁹See advisor.

⁹ECON 301, 302, 306, and 310 cannot be used to satisfy Major Requirement.

⁹Note: At least 50 percent of the total credits taken in ACCT, ECON, FIN, LAW, MGT, and MKT must be taken at Clemson University.

Study Areas

Students in the Bachelor of Science program must complete 21 credits from courses in the areas of Financial Economics, Pre-Law, the International Economy, Business Economics, Quantitative Analysis, and Public Policy. The precise lists of courses that fall under each study area are subject to change; students should consult their advisors for detailed information about these study areas.

Students are not required to complete all 21 study area credits from one area. Course groupings are intended to provide guidance to students in choosing courses that best suit their career goals. Students who are interested in pursuing advanced degrees in Economics or Business Administration should take as many courses as possible from the Quantitative Analysis study area.

FINANCIAL MANAGEMENT**Bachelor of Science**

The Bachelor of Science in Financial Management is designed to develop an understanding of financial markets in the contemporary economy, the operation of financial institutions and the financial management of business operations. The curriculum prepares students for careers in such areas as banking, corporate financial management, financial planning and services, insurance, and real estate. Governments of all levels also employ finance graduates in many of their divisions. The curriculum also provides excellent preparation for students interested in graduate business education or attending law school.

The core of the curriculum provides a broad range of subjects with an emphasis on technical and communication skills. Students then have the flexibility to tailor courses to their own needs by choosing study areas that will enhance career preparation in specific areas of finance. Students who complete a specific set of courses are eligible to sit for the certified financial planner (CFP®) examination.

Freshman Year**First Semester**

- 1 - BUS 101 Business Foundations
 - 3 - ENGL 101 Composition I
 - 3 - HIST 173 Western Civilization
 - 3 - MTHSC 102 Intro. to Mathematical Analysis¹
 - 3 - PHIL 102 Introduction to Logic
 - 4 - Science Requirement²
-
- 17

Second Semester

- 3 - CP SC 120 Issues in Computers
 - 3 - ENGL 102 Composition II
 - 3 - MTHSC 207 Multivariable Calculus¹
 - 3 - PSYCH 201 Introduction to Psychology or
 - 3 - SOC 201 Introduction to Sociology
 - 4 - Science Requirement²
-
- 16

Sophomore Year**First Semester**

- 3 - ACCT 201 Accounting Concepts I
 - 3 - ECON 211 Principles of Microeconomics
 - 3 - EX ST 301 Introductory Statistics or
 - 3 - MTHSC 301 Stat. Theory and Methods I
 - 3 - SPCH 250 Public Speaking or
 - 3 - SPCH 251 Business and Prof. Speaking
 - 3 - International Requirement³
 - 1 - Elective
-
- 16

Second Semester

- 3 - ACCT 202 Accounting Concepts II
 - 1 - ACCT 204 Accounting Procedures
 - 3 - ECON 212 Principles of Macroeconomics
 - 3 - MA SC 310 Intro. to Management Science
 - 3 - International Requirement³
 - 3 - Literature Requirement⁴
-
- 16

Junior Year**First Semester**

- 3 - ACCT 301 Intermediate Accounting I
 - 3 - ENGL 304 Business Writing
 - 3 - FIN 307 Principles of Real Estate
 - 3 - FIN 311 Financial Management I
 - 3 - MGT 301 Principles of Management
-
- 15

Second Semester

- 3 - ACCT 302 Intermediate Accounting II
 - 3 - FIN 305 Investment Analysis
 - 3 - FIN 308 Financial Institutions and Markets
 - 3 - FIN 312 Financial Management II
 - 3 - LAW 312 Commercial Law
 - 3 - Elective
-
- 18

Senior Year**First Semester**

- 3 - MKT 301 Principles of Marketing
 - 9 - Study Area⁵
 - 3 - Elective
-
- 15

Second Semester

- 3 - MGT 415 Business Strategy
 - 6 - Study Area⁵
 - 6 - Elective
-
- 15

128 Total Semester Hours

¹Credits earned in MTHSC 106 and 108 may be substituted for MTHSC 102 and 207, respectively, and one or two elective hours.

²See General Education Requirements.

³Either complete a two-semester modern foreign language sequence (level to be determined through placement and advising) or complete six hours of coursework on the culture, geography, history, literature, or political environment of a nation or region other than the United States. A list of approved courses is available through advising. If an eight-hour elementary modern foreign language sequence is chosen, two elective hours are used to accommodate the difference in credit hours. Students choosing to continue study of a language begun in high school should complete those courses during the freshman year and complete the Science Requirement during the sophomore year.

⁴ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210, or 300-level foreign language literature.

⁵Fifteen semester hours from one of the following Study Areas along with its corresponding courses. A study area should be selected by the end of the second semester of the junior year in consultation with Finance Department advisor.

Accounting—Two courses from FIN 399, 402, 404, and three accounting electives. (See Note 3.)

Corporate Finance—FIN 402, 404, 411; two courses from FIN 399, 405, 406, 408, and ACCT 406.

Financial Institutions—FIN 405, 406, 408, and 411; one course from FIN 304, 399, 417.

Financial Planning—ACCT 404, 408, FIN 304, 405, 409. Students are encouraged to take FIN 399 as an elective.

International Finance—FIN 406, 411; one course from FIN 399, MGT 423, MKT 427; two courses in a foreign language in addition to the international requirement courses.

Investments—ACCT 404, FIN 405, 406, 411; one course from FIN 304, 399, 417, MKT 428.

Real Estate—AP EC 313, FIN 417, LAW 333; one course from FIN 304, 411; one course from AP EC 413, FIN 399, LAW 405.

Notes:

1. Financial Management majors are required to have a grade-point ratio of at least 2.0 in all FIN-designated courses in order to graduate. Only the last grade for courses that are repeated counts for computing this grade-point ratio.
2. At least 50 percent of the total credits taken in ACCT, ECON, LAW, MGT and MKT must be taken at Clemson.
3. Accounting electives may be selected from any 300- or 400-level course offered by the School of Accountancy. Credit may not be received for both ACCT 303 and 307.
4. Students using FIN 399 in a study area must register for three credits.

GRAPHIC COMMUNICATIONS

Bachelor of Science

The Bachelor of Science degree in Graphic Communications prepares students for professional careers in printing, publishing, packaging, and related industries. The core curriculum assures graduates of having the skills and knowledge required by most entry-level jobs. The major requirements allow each student to select courses which enhance career preparation in specific segments of graphic communications. Coursework is heavily oriented around individual laboratory performance which stresses the development of problem-solving skills in a broad cross section of manufacturing areas. Applications include all major processes and a variety of industry segments, including commercial printing, publishing, package production, specialty printing, and industrial applications of printing technology beyond communications. The most common career opportunities are in printing management, production planning and supervision, and commercial and technical sales.

Freshman Year

First Semester

- 1 - ENGL 101 Composition I
- 1 - G C 101 Orientation to Graphic Comm.
- 3 - PSYCH 201 Introduction to Psychology
- 3 - THRD 180 Intro. to Computer-Aided Drafting
- 4 - Approved Laboratory Science Requirement¹
- 3 - Mathematical Sciences Requirement²

17

Second Semester

- 3 - CP SC 120 Issues in Computers
- 3 - ENGL 102 Composition II
- 3 - EX ST 301 Introductory Statistics or
- 3 - MTHSC 203 Elem. Statistical Inference or
- 3 - MTHSC 301 Stat. Theory and Methods I
- 4 - G C 104 Graphic Communications I
- 4 - Approved Laboratory Science Requirement¹

17

Sophomore Year

First Semester

- 3 - ACCT 203 Financial Accounting³
- 3 - G C 207 Graphic Communications II
- 3 - G C 215 Photo. and Digital Imaging Tech.
- 3 - MGT 301 Principles of Management
- 4 - Approved Laboratory Science Requirement¹

16

Second Semester

- 3 - ACCT 307 Managerial Accounting
- 3 - ECON 200 Economic Concepts or
- 3 - ECON 201 Principles of Economics or
- 3 - ECON 211 Principles of Microeconomics
- 3 - G C 310 Alternative Approaches to Imaging
- 3 - MGT 218 Mgt. Appl. of Microcomputers
- 3 - SPCH 250 Public Speaking or
- 3 - SPCH 251 Business and Prof. Speaking
- 3 - THRD 224 Machine Tool Processes

18

- 1 - G C 350 Graphic Comm. Internship I⁴

Junior Year

First Semester

- 3 - EN SP 200 Intro. to Environmental Science
- 2 - G C 405 Package and Specialty Printing
- 2 - G C 406 Package and Specialty Printing Lab.
- 3 - MGT 307 Personnel Management or
- 3 - PSYCH 364 Industrial Psychology
- 3 - THRD 250 Electricity
- 3 - Literature Requirement⁵

16

Second Semester

- 3 - ENGL 314 Technical Writing
- 5 - G C 440 Advanced Lithographic Methods
- 2 - G C 406 Package and Specialty Printing Lab.
- 3 - MKT 301 Principles of Marketing
- 3 - PHIL 344 Business Ethics

17

- 1 - G C 450 Graphic Comm. Internship II⁴

Senior Year

First Semester

- 4 - G C 444 Current Dev. and Trends in G.C.
- 3 - THRD 360 Ind. Organizations and Safety
- 6 - Major Requirement⁶
- 3 - Elective

16

Second Semester

- 3 - G C 448 Plan. and Cont. Printing Functions
- 2 - G C 480 Senior Seminar in Graphic Comm.
- 4 - Major Requirement⁶
- 7 - Elective

16

135 Total Semester Hours

¹Approved Laboratory Science Requirement must include a two-semester sequence from chemistry or physics.

²See General Education Requirements.

³ACCT 201 and 202 may be taken in lieu of 203.

⁴One internship must be in a fall or spring semester. (Summer at least 12 weeks; fall/spring 15 week minimum.) G C 455 will not substitute for G C 450.

⁵ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

⁶Major Requirements must be approved by Graphic Communications faculty advisor prior to registration. A list of acceptable major requirements is available in the Graphic Communications Office.

INDUSTRIAL MANAGEMENT

Bachelor of Science

The Bachelor of Science degree in Industrial Management prepares students for management challenges in manufacturing, production planning, inventory control, quality assurance, and service operations. Students receive a broad-based education in business, but particular emphasis is placed on systems, theories, and issues dealing with the production of goods and services. The program is particularly relevant in today's economic environment, where improvements in productivity and quality are essential to meet the growing challenges of foreign producers. In addition to jobs in manufacturing management, graduates in Industrial Management are sometimes sought for positions as project directors by government agencies and research centers. Financial institutions have found the industrial management graduate well prepared for internal operations management as well as for liaison positions dealing with manufacturing companies as bank customers. The Industrial Management program is accredited by the American Assembly of Collegiate Schools of Business and has received a special commendation for excellence from the South Carolina Commission on Higher Education.

Students who have attended Clemson at least one semester may change majors to Industrial Management with at least a 2.2 cumulative grade-point ratio. Exceptions must be approved by the department chair.

Freshman Year

First Semester

- 1 - BUS 101 Business Foundations¹
- 3 - ENGL 101 Composition I
- 3 - HIST 173 Western Civilization¹
- 3 - MTHSC 102 Intro. to Mathematical Analysis
- 3 - PHIL 102 Introduction to Logic¹
- 4 - Science Requirement²

17

Second Semester

- 3 - CP SC 120 Issues in Computers
- 3 - ENGL 102 Composition II
- 3 - MTHSC 207 Multivariable Calculus
- 3 - PSYCH 201 Introduction to Psychology¹ or
- 3 - SOC 201 Introduction to Sociology¹
- 4 - Science Requirement²

16

Sophomore Year

First Semester

- 3 - ACCT 201 Accounting Concepts I
- 3 - ECON 211 Principles of Microeconomics
- 3 - EX ST 301 Introductory Statistics or
- 3 - MTHSC 301 Stat. Theory and Methods I
- 3 - SPCH 250 Public Speaking¹
- 3 - International Studies Requirement³
- 1 - Elective

16

Second Semester

- 3 - ACCT 202 Accounting Concepts II
- 3 - ECON 212 Principles of Microeconomics
- 3 - MGT 218 Mgt. Appl. of Microcomputers⁴
- 3 - International Studies Requirement^{1,5}
- 3 - Literature Requirement^{1,5}

1 - Elective

16

Junior Year**First Semester**

- 3 - ACCT 307 Managerial Accounting
- 3 - MA SC 310 Intro. to Management Science⁴
- 3 - MKT 301 Principles of Marketing
- 3 - PHIL 344 Business Ethics
- 3 - Writing Intensive Requirement⁶

3 - Elective

18

Second Semester

- 3 - FIN 306 Corporation Finance
- 3 - LAW 322 Legal Environment of Business
- 3 - MA SC 312 Decision Models for Mgt.⁴
- 3 - MGT 305 Economics of Transportation⁴ or
- 3 - MGT 317 Logistics Management⁴
- 3 - MGT 307 Personnel Management⁴
- 3 - MGT 390 Operations Management⁴

18

Senior Year**First Semester**

- 3 - ECON (MGT) 306 Managerial Economics⁴
- 3 - MA SC 414 Statistical Analysis⁴
- 3 - MGT 400 Mgt. of Organizational Behavior⁴
- 3 - MGT 402 Operations Planning and Control⁴
- 3 - MGT 418 Management Information Systems⁴

1 - Elective

16

Second Semester

- 3 - MGT 404 Adv. Statistical Quality Control⁴
- 3 - MGT 408 Design of Production Systems⁴
- 3 - MGT 415 Business Strategy⁴
- 3 - MGT 423 International Business Mgt.⁴

4 - Elective

16

133 Total Semester Hours

¹May be taken during either first or second semester of designated year.²A two-semester sequence in the same physical or biological science, each including a laboratory.³Either complete a two-semester foreign language sequence (level to be determined through advising) or complete six hours of coursework on the geography, history, literature, religion, arts, or political or cultural environment of a nation or region other than the United States. A list of approved courses is available through advising. If an eight-hour elementary language sequence is approved, then six hours will be credited to the international requirement and two hours will be credited to free electives.⁴Industrial Management majors need a grade of C or higher in this course for graduation.⁵Choose from sophomore literature courses (200 level only) or foreign language literature courses (300 level or higher).⁶See major advisor for General Education Requirements.**Note:** At least 50 percent of the total credits taken in ACCT, FIN, LAW, MA SC, MGT, and MKT must be taken at Clemson University.**MANAGEMENT****Bachelor of Science**

The Bachelor of Science degree in Management prepares students for careers as professional managers in corporations, governmental organizations, and small businesses. In addition, the program provides a foundation for graduates who wish to pursue advanced degrees in business and public administration, law, and the social sciences.

The curriculum gives students a broad exposure to the functional areas of business and allows each to select an area of emphasis in a subject that is germane to individual career interests. The Management curriculum provides an examination of the social, legal, political, and economic environments in which organizations must operate; an understanding of the functional areas of business and their interrelationships; and a knowledge of behavioral science, applied statistics, and mathematics as they relate to organizational problem solving. The program is accredited by the American Assembly of Collegiate Schools of Business.

Students who have attended Clemson at least one semester may change majors to Management with at least a 2.2 cumulative grade-point ratio. Exceptions must be approved by the department chair.

Freshman Year**First Semester**

- 1 - BUS 101 Business Foundations¹
- 3 - ENGL 101 Composition I
- 3 - HIST 173 Western Civilization¹
- 3 - MTHSC 102 Intro. to Mathematical Analysis
- 3 - PHIL 102 Introduction to Logic¹
- 4 - Science Requirement²

17

Second Semester

- 3 - CP SC 120 Issues in Computers
- 3 - ENGL 102 Composition II
- 3 - MTHSC 207 Multivariable Calculus
- 3 - PSYCH 201 Introduction to Psychology¹ or
- 3 - SOC 201 Introduction to Sociology¹
- 4 - Science Requirement²

16

Sophomore Year**First Semester**

- 3 - ACCT 201 Accounting Concepts I
- 3 - ECON 211 Principles of Microeconomics
- 3 - EX ST 301 Introductory Statistics or
- 3 - MTHSC 301 Stat. Theory and Methods I
- 3 - SPCH 250 Public Speaking¹
- 3 - International Studies Requirement³

1 - Elective

16

Second Semester

- 3 - ACCT 202 Accounting Concepts II
- 3 - ECON 212 Principles of Macroeconomics
- 3 - MGT 218 Mgt. Appl. of Microcomputers⁴
- 3 - International Studies Requirement³
- 3 - Literature Requirement^{1,5}

1 - Elective

16

Junior Year**First Semester**

- 3 - ACCT 307 Managerial Accounting
- 3 - MA SC 310 Intro. to Management Science⁴
- 3 - MKT 301 Principles of Marketing
- 3 - PHIL 344 Business Ethics
- 3 - Writing Intensive Requirement⁶

3 - Elective

18

Second Semester

- 3 - FIN 306 Corporation Finance
- 3 - LAW 322 Legal Environment of Business
- 3 - MA SC 312 Decision Models for Mgt.⁴
- 3 - MGT 307 Personnel Management⁴
- 3 - Economics Requirement⁷

3 - Elective

18

Senior Year**First Semester**

- 3 - MGT 390 Operations Management⁴
- 3 - MGT 400 Mgt. of Organizational Behavior⁴
- 3 - MGT 418 Management Information Systems⁴
- 6 - Study Area^{4,8,9}

2 - Elective

17

Second Semester

- 3 - MGT 415 Business Strategy⁴
- 3 - MGT 423 International Business Mgt.⁴
- 3 - Operations Management Requirement^{4,10}
- 6 - Study Area^{4,8,9}

15

133 Total Semester Hours

¹May be taken during either first or second semester of designated year.²A two-semester sequence in the same physical or biological science including a laboratory.³Either complete a two-semester foreign language sequence (level to be determined through advising) or complete six hours of coursework on the geography, history, literature, religion, arts, or political or cultural environment of a nation or region other than the United States. A list of approved courses is available through advising. If an eight-hour elementary language sequence is approved, then six hours will be credited to the international requirement and two hours will be credited to free electives.⁴Management majors need a grade of C or higher in this course for graduation.⁵Choose from sophomore literature courses (200 level only) or foreign language literature courses (300 level or higher).⁶See major advisor for General Education Requirements.⁷Select from ECON 301, 308, 309, 314.⁸Twelve semester hours beyond required courses in any one of the following three tracks. Students should select their study area as soon as possible.*Human Resources Management* (Students should consult their advisors before selecting courses.)—ECON 301, 308, LAW 401, MGT 416, 425, 431, 435, PSYCH 364, 368, 435.*International Management*—ECON 310, FIN 411, LAW 420, plus either L&IT 401, MKT 427, MGT 424, 444 (three hours), or PO SC 373.*Transportation and Logistics*—MGT 305, 317, 424, plus either MGT 426, 427, 430, or 490.¹⁰In lieu of a study area, students may select an approved minor (see pages 30–33) with the approval of their faculty advisor and the management department chair.¹⁰Select from MGT 402, 404, 408, 411, 427.**Note:** At least 50 percent of the total credits taken in ACCT, FIN, LAW, MA SC, MGT, and MKT must be taken at Clemson University.

MARKETING

Bachelor of Science

The Bachelor of Science degree program in Marketing is accredited by the American Assembly of Collegiate Schools of Business. The program educates students in various aspects of marketing. The curriculum prepares students for professional marketing careers in industry, government, or the non-profit sector. Graduates should also be well prepared for entrance into the Master of Business Administration, Law, or other graduate programs. For students who want a general perspective of marketing, the curriculum provides a broad range of subjects including sales management, public and non-profit marketing, entrepreneurship, professional selling, promotional strategy, marketing research, marketing management, and international marketing. Study areas in technical marketing and services marketing are available to students who seek to specialize. The Marketing curriculum, whether approached from a general or specialized perspective, provides the conceptual, quantitative, and analytical skills necessary for students to function in a dynamic business environment.

Freshman Year

First Semester

- 1 - BUS 101 Business Foundations¹
- 3 - ENGL 101 Composition I
- 3 - HIST 173 Western Civilization¹
- 3 - MTHSC 102 Intro. to Mathematical Analysis²
- 3 - PHIL 102 Introduction to Logic¹
- 4 - Science Requirement³

17

Second Semester

- 3 - CP SC 120 Issues in Computers
- 3 - ENGL 102 Composition II
- 3 - MTHSC 207 Multivariable Calculus²
- 3 - PSYCH 201 Introduction to Psychology¹ or
- 3 - SOC 201 Introduction to Sociology¹
- 4 - Science Requirement³

16

Sophomore Year

First Semester

- 3 - ACCT 201 Accounting Concepts I
- 3 - ECON 211 Principles of Microeconomics
- 3 - MTHSC 301 Statistical Theory and Methods I
- 3 - SPCH 250 Public Speaking¹ or
- 3 - SPCH 251 Business and Prof. Speaking¹
- 3 - International Studies Requirement⁴
- 1 - Elective

16

Second Semester

- 3 - ACCT 202 Accounting Concepts II
- 3 - ECON 212 Principles of Macroeconomics
- 3 - MA SC 310 Intro. to Management Science
- 3 - International Studies Requirement⁴
- 3 - Literature Requirement^{1,5}
- 1 - Elective

16

Junior Year

First Semester

- 3 - LAW 312 Commercial Law or
- 3 - LAW 322 Legal Environment of Business
- 3 - MGT 301 Principles of Management
- 3 - MKT 301 Principles of Marketing
- 6 - Study Area Requirement⁶
- 3 - Writing Intensive Requirement⁷

18

Second Semester

- 3 - FIN 306 Corporate Finance
- 3 - MKT 302 Consumer Behavior
- 3 - MKT 431 Marketing Research
- 3 - PHIL 344 Business Ethics
- 3 - Study Area Requirement⁶

15

Senior Year

First Semester

- 3 - MGT 415 Business Strategy
- 3 - MKT 427 International Marketing
- 6 - Study Area Requirement⁶
- 4 - Elective

16

Second Semester

- 3 - MKT 450 Strategic Marketing Management
- 9 - Study Area Requirement⁶
- 4 - Elective

16

130 Total Semester Hours

¹Course may be taken during either first or second semester of designated year.

²Credit earned in MTHSC 106 and 108 may be substituted for MTHSC 102 and 207 respectively, and one or two elective hours.

³A two-semester sequence in the same physical or biological science including laboratory.

⁴Either complete a two-semester modern foreign language sequence (level to be determined through advising) or complete six hours of coursework on the culture, geography, history, literature, or political environment of a nation or region other than the United States. A list of approved courses is available through advising. If an eight-hour elementary modern foreign language sequence is chosen, two elective hours are used to accommodate the difference in credit hours. Students choosing to continue study of a language begun in high school should complete those courses during the freshman year and complete the Science Requirement during the sophomore year.

⁵ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210, or foreign language literature courses (300 level or higher).

⁶Select from one of the study areas listed below. See advisor for list of approved courses for the additional hours required in each study area.

General Marketing Study Area—MKT 420 or 423; MKT 426 or 428 or 429; any one additional MKT course; and an additional 15 hours of approved courses. Options available are Business-to-Business, Communications, General, Pre-Law, Pre-MBA, and Public Sector.

Services Marketing Study Area—MKT 420 or 423; 426 or 429; 428; and an additional 15 hours of approved courses. Options available are Banking, Entrepreneurship, Food Services, Health/Hospital Administration, Real Estate, Recreation, Sports, Tourism, and other service-related areas subject to approval by Services Marketing Study Area Advisor.

Technical Marketing Study Area—MKT 420 and 426; MKT 424 or 430; and an additional 12 hours of approved courses. Options available are Biology, Chemistry, Computer Science, Engineering, Environmental Science, Food Science, Graphic Communications, Logistics, Packaging

Science, Textile Chemistry, Textile Science, and other technical areas subject to approval by Technical Marketing Study Area Advisor.

⁷See General Education Requirements.

Notes:

1. Marketing majors are required to have a grade-point ratio of at least 2.0 in all MKT-designated courses in order to graduate. Only the last grade for courses that are repeated counts in computing this grade-point ratio.
2. At least 50 percent of the total credit hours taken in ACCT, FIN, LAW, MGT, and MKT must be taken at Clemson University.

SCHOOL OF SOCIAL SCIENCES

Bachelor of Arts degrees in social sciences are offered in Political Science, Psychology, and Sociology. Bachelor of Science degrees are also offered in Psychology and Sociology. The curricula are designed to meet the needs of students desiring a broad general education, with emphasis on the humanities, as preparation for intelligent citizenship, general commercial and industrial life, government service, and teaching. These curricula also provide an excellent background for the study of law, journalism, and medicine.

To achieve depth as well as breadth in their educational experience, students select major concentrations consisting of at least 24 semester hours from courses above the sophomore level. Students also choose minor concentrations consisting of at least 15 additional semester hours. Courses satisfying a student's major concentration may not also be included in the minor. Refer to the chart on pages 30-33 for acceptable minors.

Students in the bachelor of arts program who expect to teach in the public schools may elect education courses required for teaching certificates by the South Carolina State Department of Education. Such courses are to be approved by their own department advisors.

POLITICAL SCIENCE

Bachelor of Arts

The requirements for a major in Political Science consist of the required PO SC 101, 102 or 104, 250 and at least 21 additional semester hours of political science, including at least one course from four of the following five fields:

American Government—PO SC 403, 405, 432, 442
Comparative Politics—PO SC 371, 373, 471, 472, 476, 477, 478

International Relations—PO SC 361, 362, 363, 428, 465

Political Theory—PO SC 451, 452, 453

Public Policy and Public Administration—PO SC 302, 321, 421, 423, 424

The student's elective hours in political science are chosen with the consent and advice of the department advisor to ensure an appropriate balance of breadth and specialization within the field of political science. In addition to the courses listed above, the department offers a wide range of specialized courses in each of the subfields of the political science discipline.

Note: No more than six hours credit from PO SC 310, 311, and 312 may be counted toward any degree; no more than three hours credit from these courses may be applied to the requirements of a Political Science major.

Freshman Year

First Semester

- 3 - ENGL 101 Composition I
- 3 - MTHSC 101 Introduction to Probability¹
- 3 - PO SC 101 Introduction to American Politics
- 4 - Foreign Language Requirement²
- 4 - Science Requirement³

17

Second Semester

- 3 - ENGL 102 Composition II
- 3 - MTHSC 102 Intro. to Mathematical Analysis¹
- 3 - PO SC 102 Introduction to Global Issues
- 4 - Foreign Language Requirement²
- 4 - Science Requirement³

17

Sophomore Year

First Semester

- 3 - HIST 172 Western Civilization
- 3 - PO SC 250 Introduction to Political Science
- 3 - Computer Skills Requirement¹
- 3 - Foreign Language Requirement²
- 3 - Literature Requirement⁴
- 3 - Oral Communication Requirement⁵

18

Second Semester

- 3 - HIST 173 Western Civilization
- 3 - Foreign Language Requirement²
- 3 - Literature Requirement⁴
- 6 - Major and Minor Areas⁵
- 3 - Writing Intensive Requirement¹

18

Junior Year

First Semester

- 3 - ECON 211 Microeconomics
- 3 - Advanced Humanities Requirement⁶
- 6 - Major and Minor Areas⁵
- 3 - Elective

15

Second Semester

- 3 - ECON 212 Macroeconomics
- 3 - Advanced Humanities Requirement⁶
- 6 - Major and Minor Areas⁵
- 3 - Elective

15

Senior Year

First Semester

- 3 - Advanced Humanities Requirement⁶
- 6 - Major and Minor Areas⁵
- 6 - Elective

15

Second Semester

- 9 - Major and Minor Areas⁵
- 6 - Elective

15

130 Total Semester Hours

¹Students may pursue alternate sequences consistent with the General Education Requirement. Examples include MTHSC 101 and 106 or 203; 102 and 207; or 106 and 108, 207, 301.

²The equivalent of two years (through 202) of the same modern language is required.

³See General Education Requirements.

⁴ENGL 202, 203, 204, 205, 206, 207, 208, 209, and H210.

⁵See the list of approved minors for political science on pages 32–33.

⁶Advanced humanities are courses numbered 300 or higher (AAH 210, MUSIC 210, THEA 210 excepted). The humanities for this purpose include art and architectural history, English (except 304, 312, 314, 316, 331, 333, 334, 335, 485, 490, 495), languages, music, philosophy, religion, speech (except 362 and 364), theatre (except 377, 487, and 497), and women's studies, as well as courses entitled Humanities.

PSYCHOLOGY

Psychology is the study of human and animal behavior and the biological, psychological, and social processes related to that behavior. The Bachelor's degree in Psychology is designed to prepare students for a variety of professional careers related to human resources, personnel, counseling, and other people-oriented positions in human services, business, and industry. Additionally, the Bachelor's degree provides excellent preparation for graduate training in such areas as clinical, counseling, industrial, experimental, cognitive, social, biological, health, developmental, and school psychology. The program also provides excellent preparation for students who intend to pursue professional training in medicine, physical or occupational therapy, dentistry, pharmacy, veterinary science, or law.

Bachelor of Arts

The requirements for the Bachelor of Arts program consist of PSYCH 201, 210, 310, 324, 333, 352, at least one laboratory course (PSYCH 321, 325, 334, 423), plus 15 additional credits in psychology at the 300 or 400 level. These 15 credits must include a minimum of six credits at the 400 level, at least three of which must be from courses numbered between 400 and 489. BIOSC 470 may be taken in lieu of one 300- or 400-level elective psychology course.

Students should consult their academic advisors for other degree requirements and course recommendations.

Freshman Year

First Semester

- 3 - ENGL 101 Composition I
- 3 - PSYCH 201 Introduction to Psychology
- 4 - Foreign Language Requirement¹
- 3 - Mathematical Sciences Requirement²
- 4 - Science Requirement³

17

Second Semester

- 3 - CP SC 120 Issues in Computers
- 3 - ENGL 102 Composition II
- 4 - Foreign Language Requirement¹
- 3 - Mathematical Sciences Requirement²
- 4 - Science Requirement³

17

Sophomore Year

First Semester

- 4 - PSYCH 210 Introductory Experimental Psych.
- 3 - Cultural Awareness Requirement⁴
- 3 - Foreign Language Requirement¹
- 3 - Literature Requirement⁵
- 3 - Elective

16

Second Semester

- 4 - PSYCH 310 Advanced Experimental Psych.
- 3 - Cultural Awareness Requirement⁴
- 3 - Foreign Language Requirement¹
- 3 - Humanities Requirement E.2³
- 3 - Elective

16

Junior Year

First Semester

- 6 - Major Area
- 3 - Minor Area⁷
- 3 - Social Science Requirement⁸
- 3 - Writing Intensive Requirement³
- 1 - Elective

16

Second Semester

- 3 - Humanities Requirement⁸
- 4 - Major Area
- 3 - Minor Area⁷
- 3 - Oral Communication Requirement¹
- 3 - Elective

16

Senior Year

First Semester

- 9 - Major Area
- 6 - Minor Area⁷

15

Second Semester

- 6 - Major Area
- 6 - Minor Area⁷
- 3 - Elective

15

128 Total Semester Hours

¹The equivalent of two years (through 202) of the same modern language is required.

²Recommended sequences: MTHSC 101 and 203 or 102 and 207. Other approved sequences: MTHSC 106 and 108; 106 and 301; 106 and 207; or 102 and 106.

³See General Education Requirements.

⁴See department approved listing. Courses used to fulfill the Humanities Requirement, Social Science Requirement, or Major Area cannot be used to meet this requirement.

⁵ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210, or 300-level foreign language.

⁶Humanities courses numbered 300 or higher. The humanities are for this purpose considered to include art and architectural history, English (except 304, 312, 314, 316, 331, 333, 334, 335, 485, 490, 495), languages, music, philosophy, religion, speech (except 362 and 364), theatre (except 377, 487, and 497), and women's studies, as well as courses entitled Humanities. The following 100–200 level courses are also acceptable: A H 210, CH S H203, MUSIC 210, PHIL 101, 102, 103, REL 101, 102, THEA 210.

⁷Any minor which has been approved by the University and listed on pages 32–33.

⁸See General Education Requirements. Social science other than psychology.

Bachelor of Science

The requirements for the Bachelor of Science program consist of PSYCH 201, 210, 310, 324, 333, 352, 415, at least one laboratory course (PSYCH 321, 325, 334, 423), plus 12 additional credits in psychology at the 300 or 400 level. These 12 credits must include a minimum of three credits at the 400 level. BIOSC 470 may be taken in lieu of one 300- or 400-level elective psychology course.

Students must consult their advisors for other degree requirements and course recommendations.

Freshman Year

First Semester

- 4 - BIOL 103 General Biology I¹
- 3 - CP SC 120 Issues in Computers
- 3 - ENGL 101 Composition I
- 3 - PSYCH 201 Introduction to Psychology
- 3 - Mathematical Sciences Requirement²

16

Second Semester

- 4 - BIOL 104 General Biology II¹
- 3 - ENGL 102 Composition II
- 3 - PHIL 102 Introduction to Logic
- 3 - Cultural Awareness Requirement³
- 3 - Mathematical Sciences Requirement²

16

Sophomore Year

First Semester

- 4 - PSYCH 210 Intro. Experimental Psychology
- 3 - Cultural Awareness Requirement³
- 3 - Literature Requirement⁴
- 3 - Physical or Natural Science Requirement⁵
- 3 - Elective

16

Second Semester

- 4 - PSYCH 310 Advanced Experimental Psych.
- 3 - Humanities Requirement⁶
- 3 - Mathematical Sciences Requirement⁷
- 3 - Physical or Natural Science Requirement⁵
- 3 - Social Science Requirement⁸

16

Junior Year

First Semester

- 3 - ENGL 304 Business Writing or
- 3 - ENGL 312 Advanced Expository Writing or
- 3 - ENGL 314 Technical Writing
- 6 - Major Area
- 3 - Minor Area⁹
- 3 - Physical or Natural Science Requirement⁵
- 1 - Elective

16

Second Semester

- 3 - SPCH 150 Intro. to Speech Communication or
- 3 - SPCH 250 Public Speaking or
- 3 - SPCH 251 Business and Prof. Speaking
- 4 - Major Area
- 3 - Minor Area⁹
- 3 - Social Science Requirement⁸
- 3 - Elective

16

Senior Year

First Semester

- 9 - Major Area
- 6 - Minor Area⁹
- 1 - Elective

16

Second Semester

- 6 - Major Area
- 6 - Minor Area⁹
- 4 - Elective

16

128 Total Semester Hours

¹Biology 110/111 may be substituted. In this case, the extra two credit hours must be counted as electives.

²Recommended sequence: MTHSC 101 and 203, or 102 and 207, or 106 and 108.

³See Psychology Department approved listing. Courses used to fulfill the Humanities Requirement, Social Science Requirement, or Major Area cannot be used to meet this requirement.

⁴ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210, or 300-level foreign language.

⁵Six of the nine hours must come from a two-semester sequence of a physical or natural science other than biology.

⁶Humanities courses numbered 300 or higher. The humanities for this purpose include art and architectural history, English (except 304, 312, 314, 316, 331, 333, 334, 335, 485, 490, 495), languages, music, philosophy, religion, speech (except 362 and 364), theatre (except 377, 487, and 497), and women's studies, as well as courses entitled Humanities. The following courses are also acceptable: A A H 210, MUSIC 210, THEA 210, PHIL 101, 103, and REL 101, 102.

⁷MTHSC 102, 106, or 119 for those who have completed MTHSC 101 and 203. MTHSC 119, 129, 206, 210, 301, 311, or 405 for those who have completed a sequence including MTHSC 102 or 106.

⁸See General Education Requirements. Social science other than psychology.

⁹Any minor approved by the University and listed on pages 32-33.

SOCIOLOGY

The Sociology major offers two degree programs: a bachelor of arts degree and a bachelor of science degree. Both degrees require a total of 128 semesters hours distributed as identified below. Courses used to fulfill Humanities and Mathematics or Science Requirements may be used to fill minor requirements.

Concentrations of Study in Sociology

General Sociology—One course from SOC 311, 414, or 440; one course from SOC 330, 331, or 480; one course from SOC 235, 350, or 435; and nine credits from all courses offered in sociology or anthropology not already taken to fulfill requirements.

Social Services Sociology—SOC 380, 414, 484, and (R S) 495; one course from SOC 392, 394, 396, 397, 464, and 480; and three credits from all courses offered in sociology or anthropology not already taken to fulfill requirements.

Criminal Justice Sociology—SOC 390 and (R S) 495; either SOC 392 or 393; one course from among PO SC 434, SOC 414, 491, or 493; one course from SOC 391, 396, or 397; and three credits from all courses offered in sociology and anthropology not already taken to fulfill requirements.

At least 12 of the total credits must be from 400-level sociology, rural sociology and/or anthropol-

ogy courses; no more than nine credit hours may be taken in courses at the 100 or 200 level, except with approval of the department chair. Additional electives are added to meet the minimum of 128 credits required for graduation.

Substance Abuse Certificate Program

The Substance Abuse Certificate Program is an interdisciplinary program drawn from existing courses in sociology, education, health, and psychology. Students study the causes, consequences, prevention, and treatment of substance abuse. They also study delivery systems and policy issues associated with legal and illicit substances. Through a field placement, students come face-to-face with the problem and gain considerable practical experience to prepare them to enter the field of practicing specialists. The program prepares students for state credentialing as substance abuse specialists. The credential requires knowledge in theory and treatment of substance abuse problems.

Completion of the Substance Abuse Certificate Program requires ED C 234, HLTH 301, SOC 380, 396, 397, 495, and PSYCH 375.

Bachelor of Arts

Freshman Year

First Semester

- 3 - ENGL 101 Composition I
- 3 - MTHSC 101 Introduction to Probability¹
- 3 - SOC 201 Introduction to Sociology
- 4 - Foreign Language Requirement²
- 4 - Science Requirement³

17

Second Semester

- 3 - ENGL 102 Composition II
- 3 - MTHSC 203 Elementary Statistical Inference⁴
- 4 - Foreign Language Requirement²
- 4 - Science Requirement³
- 3 - Elective

17

Sophomore Year

First Semester

- 3 - CP SC 120 Issues in Computers
- 3 - Foreign Language Requirement²
- 3 - Humanities Requirement E.1¹
- 3 - Oral Communication Requirement⁵
- 3 - Elective

15

Second Semester

- 3 - Foreign Language Requirement²
- 3 - Humanities Requirement E.2¹
- 6 - Minor⁴
- 3 - Elective

15

Junior Year

First Semester

- 4 - SOC (R S) 303 Methods of Social Research
- 3 - Advanced Humanities Requirement⁵
- 3 - Global Awareness Requirement⁶
- 3 - Sociology Concentration⁷
- 3 - Writing Intensive Requirement⁸

16

Second Semester

- 3 - Advanced Humanities Requirement⁵
- 6 - Minor⁴
- 6 - Sociology Concentration⁷
- 3 - Elective
- 18

Senior Year

First Semester

- 3 - Advanced Humanities Requirement⁵
- 6 - Sociology Concentration⁷
- 3 - Stratification Requirement⁸
- 3 - Elective
- 15

Second Semester

- 3 - SOC 404 Sociological Theory
- 3 - Advanced Humanities Requirement⁵
- 3 - Minor⁴
- 3 - Sociology Concentration⁷
- 3 - Elective
- 15

128 Total Semester Hours

¹MTHSC 106 and 301 may be substituted.

²The equivalent of two years (through 202) in the same foreign language is required.

³See General Education Requirements.

⁴See pages 32–33 for approved minors.

⁵Advanced humanities are courses numbered 300 or higher (A A H 210, MUSIC 210, THEA 210 excepted). The humanities for this purpose include art and architectural history, English (except 304, 312, 314, 316, 331, 333, 334, 335, 485, 490, 495), languages, music, philosophy, religion, speech (except 362 and 364), theatre (except 377, 487, 497), and women's studies, as well as courses entitled Humanities.

⁶ANTH 301, SOC 312, or 433.

⁷See advisor.

⁸SOC 460, 461, or 464.

Bachelor of Science

Freshman Year

First Semester

- 3 - ENGL 101 Composition I
- 3 - MTHSC 101 Introduction to Probability¹
- 3 - SOC 201 Introduction to Sociology
- 3 - Humanities Requirement E.2²
- 4 - Science Requirement²
- 16

Second Semester

- 3 - ENGL 102 Composition II
- 3 - MTHSC 203 Elementary Statistical Inference¹
- 3 - Humanities Requirement E.1²
- 4 - Science Requirement²
- 3 - Elective
- 16

Sophomore Year

First Semester

- 3 - CP SC 120 Issues in Computers
- 6 - Mathematics or Science Requirement³
- 3 - Oral Communication Requirement²
- 3 - Elective
- 15

Second Semester

- 4 - Mathematics or Science Requirement³
- 6 - Minor⁴
- 5 - Elective
- 15

Junior Year

First Semester

- 3 - ENGL 314 Technical Writing
- 4 - SOC (R S) 303 Methods of Social Research
- 3 - Global Awareness Requirement⁵
- 3 - Philosophy Requirement⁶
- 3 - Sociology Concentration⁷
- 16

Second Semester

- 3 - Advanced Humanities Requirement⁸
- 6 - Minor⁴
- 6 - Sociology Concentration⁷
- 3 - Elective
- 18

Senior Year

First Semester

- 3 - ANTH 351 Physical Anthropology⁹
- 5 - Mathematics or Science Requirement³
- 3 - Sociology Concentration⁷
- 3 - Stratification Requirement¹⁰
- 3 - Elective
- 17

Second Semester

- 3 - SOC 404 Sociological Theory
- 6 - Sociology Concentration⁷
- 3 - Minor⁴
- 3 - Elective
- 15

128 Total Semester Hours

¹MTHSC 106 and 301 may be substituted.

²See General Education Requirements.

³See advisor. At least six of the 15 hours must be at the 300-level or above.

⁴See page 32–33 for approved minors.

⁵ANTH 301, SOC 312, or 433.

⁶Select from PHIL 323, 325, 326, 327, 355, or 360.

⁷See advisor.

⁸Advanced humanities are courses numbered 300 or higher (A A H 210, MUSIC 210, and THEA 210 excepted). The humanities for this purpose include art and architectural history, English (except 304, 312, 314, 316, 331, 333, 334, 335, 485, 490, and 495), languages, music, philosophy, religion, speech (except 362 and 364), theatre (except 377, 487, and 497), and women's studies, as well as courses entitled Humanities.

⁹May not be used to fill the 34 credits for the major.

¹⁰SOC 460, 461, or 464.

COLLEGE OF ENGINEERING AND SCIENCE

The College of Engineering and Science offers a broad range of rigorous and stimulating baccalaureate programs which provide unexcelled educational opportunities. The innovative combination of engineering and science disciplines which comprise the College facilitates study and research in fields transcending the traditional disciplines. Students enjoy close interaction with a distinguished faculty committed to excellence in undergraduate education as well as in research. The College Web site at www.ces.clemson.edu/ has further information on the College and its programs. The engineering, science, and textiles curricula are described below in separate sections to facilitate presentation of degree requirements.

Minors

Engineering and science students can pursue special areas of interest by selecting a minor concentration of study. Available minors include Bioengineering, Ceramic Engineering, Environmental Engineering, International Engineering and Science, one in each of the science majors and in Textiles, and numerous others (see page 34).

International Programs

As the world economy becomes every more tightly integrated, it is increasingly important that engineering and science students prepare themselves for this global environment. The College offers several programs that provide opportunities for students to gain international experience, including EPIC (an international co-op program) and several study abroad options. In addition, engineering and science students are encouraged to pursue study of a foreign language. Information on international programs is available in the Undergraduate Studies Office (107 Riggs Hall) and on our Web site at www.ces.clemson/~global.

ENGINEERING PROGRAMS

The professional Bachelor of Science engineering degrees in Biosystems Engineering, Ceramic and Materials Engineering, Chemical Engineering, Civil Engineering, Computer Engineering, Electrical Engineering, Industrial Engineering, and Mechanical Engineering are each accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology. The Biosystems Engineering program is administered jointly with the College of Agriculture, Forestry, and Life Sciences.

All engineering programs have the common goal of producing engineering graduates who are able to

- apply knowledge of math, science, and engineering;
- formulate and solve engineering problems;
- design and conduct experiments and analyze data;
- design systems or components to meet needs;
- function on multidisciplinary teams;
- communicate effectively;
- conduct themselves professionally and ethically;
- appreciate engineering's global/societal context;

- understand contemporary engineering issues;
- apply modern engineering methods and tools;
- appreciate the need for life-long learning.

Each engineering program has additional objectives specific to the discipline. All prepare students for a wide range of career opportunities and provide sound preparation for graduate study. Each curriculum provides opportunities for students to pursue individual areas of interest.

Admission Requirements

The University admission requirements are given on page 10. Engineering applicants are strongly advised to include the following in their high school program:

Mathematics—Four units, including geometry, trigonometry, and introductory calculus.

Laboratory Science—At least three units, including both chemistry and physics.

Computing—At least one unit, including introduction to a programming language. Applicants should have good keyboarding skills.

General Engineering Program

All engineering students must complete a common curriculum for the freshman year before being admitted into an engineering baccalaureate degree program. All new engineering students (including transfer students) are admitted into General Engineering until all classes in the freshman curriculum are satisfactorily completed. Students with no programming experience who plan to enter Computer Engineering should consult an advisor about taking CP SC 111 or 101 as an elective in the first semester.

Freshman Curriculum

First Semester

- 4 - CH 101 General Chemistry
- 3 - ENGL 101 Composition I
- 1 - ENGR 101 Introduction to Engineering
- 4 - MTHSC 106 Calculus of One Variable I
- 3 - Humanities/Social Science Requirement¹

15

Second Semester

- 4 - CH 102 General Chemistry
- 3 - ENGL 102 Composition II
- 3 - ENGR 120 Engineering Problem Solving and Design
- 4 - MTHSC 108 Calculus of One Variable II
- 3 - PHYS 122 Physics with Calculus I

17

¹History 122 is strongly recommended. See policy on Humanities and Social Sciences for Engineering Curricula for other acceptable courses.

Admission into Engineering Degree Programs

To transfer into an engineering degree program, a student must have a 2.0 minimum cumulative grade-point ratio in courses taken at Clemson and have completed the General Engineering freshman curriculum. Students entering General Engineering after May 15, 1996, must also have a C or better in each course in the freshman curriculum except the humanities/social science requirement.

A change-of-major request should be initiated by the student prior to the registration period during the semester in which he/she expects to complete the freshman curriculum. Students who fail to meet the requirements for admission into a degree granting program may remain in General Engineering until those requirements are met; however, the only engineering courses in which they can enroll are CME 210, EG 209, EM 201 and 202, and ENGR 101 and 120. Students transferring into an engineering degree program will follow the curriculum in effect at the time of transfer.

Policy on Humanities and Social Sciences for Engineering Curricula

Engineers have an obligation to practice their profession in a socially responsible manner. The education of engineers must prepare them for these responsibilities and make them aware of the constraints imposed by societal factors. Thus, an important component of the engineering curricula is a program of study of the humanities and social sciences in which students are required to achieve depth of knowledge in one or two areas rather than simply taking a collection of introductory courses.

This program of study must include a minimum of 15 credits selected so as to satisfy the University's General Education policy on humanities and social sciences (page 28) as well as meeting engineering objectives. Thus, the courses chosen must satisfy all of the following four criteria:

1. Six credits of General Education humanities courses, which must include:
 - a) Three credits of sophomore literature (200 level) or foreign language literature (300 level or higher) selected from General Education Section E.1.¹
 - b) Three credits selected from courses in General Education Section E.2.²
2. Six credits of social science courses selected from General Education Section F.³
3. At least three additional credits selected from the List of Approved Humanities and Social Science Courses for Engineering Curricula (this list includes General Education courses, plus additional choices).
4. To provide depth, the courses chosen must contain either
 - a) Nine credits in a single subject area or
 - b) Six credits in each of two different subjects.

Individual engineering curricula may have more specific requirements (e.g., an economics course or a second literature course may be required), or may require more than 15 hours of humanities/social science courses. Students should consult their academic advisors for information.

¹All courses must be selected from the List of Approved Humanities and Social Science Courses for Engineering Curricula. Specifically, some courses approved in the General Education policy may not be accepted by the College of Engineering and Science because of Accreditation Board for Engineering and Technology (ABET) restrictions.

Policy on Electives for Engineering Curricula

Advisors must approve any course taken for elective credit in the Engineering curricula. Courses excluded for elective credit include PHYS 200, 207, 208.

Registration Requirements

A cumulative grade-point average of 2.0 or higher is required for registration in engineering courses numbered 300 or higher. Preference for registration in engineering courses is given to those majors for whom the course is a degree requirement. Exceptions to this requirement may be granted by the department offering the course.

Graduation Requirements

In addition to other institutional requirements, candidates for a baccalaureate degree in Engineering are required to have a 2.0 or higher cumulative grade-point ratio in all engineering courses taken at Clemson. All courses with "Engineering" in the course designator (e.g., ENGR 120, ME 453, etc.) are used in this calculation.

The baccalaureate programs in Engineering are designed to be completed in four years (eight regular semesters). Taking a reduced load or participating in cooperative education will extend this time. On average, Clemson engineering students take about four and one-half years to complete the requirements for graduation.

BIOSYSTEMS ENGINEERING

Bachelor of Science

The principal objective of the biosystems engineering program is to educate and prepare students for a wide range of engineering endeavors involving biological entities. Three main areas are supported: engineering for management of natural resources and the environment; engineering for environmentally-sound and sustainable production systems for food, fiber, and bioresources; and engineering for production of value-added products from bioprocessing technologies.

Biosystems engineers work at the interface between engineering and life sciences and must be knowledgeable in both disciplines. In addition to the common objectives of all engineering programs listed on page 73, Biosystems Engineering students should achieve familiarity with all biosystems emphases, experience an interdisciplinary education, and develop a career goal of professional recognition and licensure. Students develop specialization in one of four emphasis areas. Specific objectives per emphasis aim to equip students to

- apply engineering and agricultural sciences to the production of food, feed, fiber, and related consumer products (Agriculture Emphasis).
- apply engineering and biological sciences to problem solving for biological systems and production of value added bioproducts in a wide range of industries (Biotechnology Emphasis).
- apply engineering and agricultural and environmental sciences to assess and control the impact of human activities on the biosphere (Natural Resources Emphasis).

Additional information is available in the departmental offices and on our Web page at <http://www.clemson.edu/agbioeng/>.

AGRICULTURE EMPHASIS AREA

Sophomore Year

First Semester

- 2 - B E 221 Surveying for Soil and Water Res.
- 2 - E G 209 Intro. to Engr./Comp. Graphics
- 3 - E M 201 Engineering Mechanics: Statics
- 4 - MTHSC 206 Calculus of Several Variables
- 3 - PHYS 221 Physics with Calculus II
- 3 - Elective

17

Second Semester

- 2 - B E 214 Fabrication and Manufacturing Meth.
- 3 - E M 202 Engineering Mechanics: Dynamics
- 3 - ECON 211 Principles of Microeconomics or
3 - ECON 200 Economic Concepts or
3 - ECON 201 Principles of Economics¹
- 4 - MTHSC 208 Intro. to Ord. Diff. Equations
- 3 - SPCH 250 Public Speaking
- 3 - Literature Requirement²

18

Junior Year

First Semester

- 2 - B E 357 Machine Unit Operations
- 2 - E C E 307 Basic Electrical Engineering
- 3 - E M 304 Mechanics of Materials
- 3 - M E 310 Thermodynamics and Heat Transfer
- 3 - Humanities/Social Science Requirement³
- 3 - Plant/Animal Science Requirement⁴

16

Second Semester

- 3 - B E 322 Small Watershed Hydrology and Sedimentology
- 2 - B E 333 Environmental Modification
- 2 - B E 350 Microcomputer Controls in Biosys.
- 3 - B E 362 Energy Conversion for Biosystems
- 4 - C E 341 Introduction to Fluid Mechanics
- 4 - CSENV 202 Soils

18

Senior Year

First Semester

- 3 - B E 416 Mech. Design for Ag. and Biol. Sys.
- 2 - B E 431 Structural Design for Biosystems
- 3 - B E 450 Instrumentation for Biosys. Engineers
- 3 - ENGL 314 Technical Writing
- 3 - I E 384 Engineering Economic Analysis
- 3 - Elective

17

Second Semester

- 2 - B E 421 Engr. Systems for Soil Water Mgt.
- 3 - B E 442 Properties and Proc. of Biol. Prod.
- 2 - B E 471 Engineering Research and Mgt.
- 3 - Humanities/Social Science Requirement³
- 3 - Technical Requirement⁴
- 4 - Elective

17

135 Total Semester Hours

¹ECON 200 is terminal course. ECON 211 is the preferred prerequisite for upper level courses.

²Select three hours from Humanities/Social Policy list.

³See Policy on Humanities and Social Sciences for Engineering Curricula.

⁴See advisor.

BIOTECHNOLOGY EMPHASIS AREA

Sophomore Year

First Semester

- 4 - CH 201 Survey of Organic Chemistry
- 2 - E G 209 Intro. to Engr./Comp. Graphics
- 3 - E M 201 Engineering Mechanics: Statics
- 4 - MTHSC 206 Calculus of Several Variables
- 3 - PHYS 221 Physics with Calculus II

16

Second Semester

- 2 - B E 214 Fabrication and Manufacturing Meth.
- 3 - BIOCH 301 General Biochemistry
- 1 - BIOCH 302 Molecular Biology Lab. I
- 3 - E M 202 Engineering Mechanics: Dynamics
- 4 - MTHSC 208 Intro. to Ord. Diff. Equations
- 3 - Elective

16

Junior Year

First Semester

- 2 - E C E 307 Basic Electrical Engineering
- 3 - E M 304 Mechanics of Materials
- 3 - M E 310 Thermodynamics and Heat Transfer
- 4 - MICRO 305 General Microbiology
- 3 - Humanities/Social Science Requirement¹
- 3 - Literature Requirement²

18

Second Semester

- 2 - B E 333 Environmental Modification
- 2 - B E 350 Microcomputer Controls in Biosys.
- 3 - B E 362 Energy Conversion for Biosystems
- 3 - B E (BIOSC) 430 Engr. Modeling of Biol. Sys.
- 4 - C E 341 Introduction to Fluid Mechanics
- 3 - SPCH 250 Public Speaking

17

Senior Year

First Semester

- 3 - B E 416 Mech. Design for Ag. and Biol. Sys.
- 3 - B E (CH E) 428 Biochemical Engineering
- 3 - B E 450 Instrumentation for Biosys. Engineers
- 3 - ENGL 314 Technical Writing
- 6 - Elective

18

Second Semester

- 2 - B E 421 Engr. Systems for Soil Water Mgt.
- 3 - B E 429 Appl. in Biotechnology Engineering
- 3 - B E 442 Properties and Proc. of Biol. Prod.
- 2 - B E 471 Engineering Research and Mgt.
- 3 - ECON 211 Principles of Microeconomics or
3 - ECON 200 Economic Concepts or
3 - ECON 201 Principles of Economics³
- 3 - Humanities/Social Science Requirement⁴
- 2 - Elective

18

135 Total Semester Hours

¹See Policy on Humanities and Social Sciences for Engineering Curricula.

²Select three hours from Humanities/Social Policy list.

³ECON 200 is terminal course. ECON 211 is the preferred prerequisite for upper level courses.

NATURAL RESOURCES EMPHASIS AREA

Sophomore Year

First Semester

- 2 - B E 221 Surveying for Soil and Water Res.
- 2 - E G 209 Intro. to Engr./Comp. Graphics
- 3 - E M 201 Engineering Mechanics: Statics
- 4 - MTHSC 206 Calculus of Several Variables
- 3 - PHYS 211 Physics with Calculus II
- 2 - Elective

16

Second Semester

- 2 - B E 214 Fabrication and Manufacturing Meth.
- 3 - E M 202 Engineering Mechanics: Dynamics
- 3 - ECON 211 Principles of Microeconomics or
 - 3 - ECON 200 Economic Concepts or
 - 3 - ECON 201 Principles of Economics¹
- 4 - MTHSC 208 Intro. to Ord. Diff. Equations
- 3 - SPCH 250 Public Speaking
- 3 - Literature Requirement²

18

Junior Year

First Semester

- 2 - B E 357 Machine Unit Operations
- 2 - E C E 307 Basic Electrical Engineering
- 3 - E M 304 Mechanics of Materials
- 3 - M E 310 Thermodynamics and Heat Transfer
- 3 - Biological Science Requirement³
- 3 - Humanities/Social Science Requirement⁴

16

Second Semester

- 3 - B E 322 Small Watershed Hydrol. and Sed.
- 2 - B E 333 Environmental Modification
- 2 - B E 350 Microcomputer Controls in Biosys.
- 3 - B E 362 Energy Conversion for Biosystems
- 4 - C E 341 Introduction to Fluid Mechanics
- 4 - CSENV 202 Soils

18

Senior Year

First Semester

- 3 - B E 416 Mech. Design for Ag. and Biol. Sys.
- 2 - B E 431 Structural Design for Biosystems
- 3 - B E 450 Instrumentation for Biosys. Engineers
- 3 - Approved Engineering Requirement³
- 3 - Science Requirement³
- 3 - Elective

17

Second Semester

- 3 - B E 364 Nonpoint Source Poll. Mgt. and Cont.
- 2 - B E 421 Engr. Systems for Soil Water Mgt.
- 2 - B E 471 Engineering Research and Mgt.
- 3 - ENGL 314 Technical Writing
- 3 - Humanities/Social Science Requirement⁴
- 5 - Elective

18

135 Total Semester Hours

¹ECON 200 is terminal course. ECON 211 is the preferred prerequisite for upper level courses.

²Select three hours from Humanities/Social Policy list.

³See advisor.

⁴See Policy on Humanities and Social Sciences for Engineering Curricula.

CERAMIC AND MATERIALS ENGINEERING

Bachelor of Science

Ceramic and materials engineers design and develop ceramic ware; design, develop, and supervise ceramic production; and participate in research, sales, and management in the many companies that comprise the traditional and advanced ceramics industries. The broad scope of industrial responsibilities handled by ceramic and materials engineers requires knowledge in mathematics, science, engineering, and the social sciences, skills in problem solving, engineering analysis, design, and written and verbal communications and understanding of the roles of the engineer and the profession in their global and societal contexts.

The baccalaureate program integrates laboratory and industrial processing experiences with classroom instruction to prepare students for future professional practice and life-long learning. Ceramic and materials courses cover processing, characterization, and properties of ceramic materials and advanced scientific principles designed to prepare students for careers in industry and/or for graduate studies in ceramic and materials engineering.

In addition to the common educational objectives of all engineering programs listed on page 73, Clemson University baccalaureate degree graduates in ceramic and materials engineering will be able to

- demonstrate learning consistent with Accreditation Board for Engineering and Technology Engineering Criteria 2000 for ceramic engineering programs;
- function easily and well in the laboratory and plant environments; and
- serve the local, national, and international ceramics and materials communities.

Specifically, the Accreditation Board for Engineering and Technology Engineering Criteria 2000 requires that baccalaureate degree graduates in ceramic and materials engineering will be able to

- apply advanced scientific and engineering principles to ceramic and materials engineering systems;
- demonstrate an integrated understanding of the scientific and engineering principles underlying structure, properties, processing, and performance relationships;
- apply this understanding to the solution of ceramics selection and design problems; and
- apply appropriate experimental, statistical, and computational methods to advantage in the solution of ceramics problems.

Sophomore Year

First Semester

- 3 - C M E 201 Intro. to Ceramic Engineering
- 3 - C M E 204 Laboratory Procedures
- 3 - E M 201 Engineering Mechanics: Statics
- 4 - MTHSC 206 Calculus of Several Variables
- 3 - PHYS 221 Physics with Calculus II

16

Second Semester

- 3 - C M E 202 Processing Ceramic Raw Materials into Products
- 3 - C M E 210 Introduction to Materials Science
- 2 - E G 209 Intro. to Engr./Comp. Graphics
- 3 - ENGL 314 Technical Writing
- 4 - MTHSC 208 Intro. to Ord. Diff. Equations
- 3 - Elective

18

Junior Year

First Semester

- 3 - C M E 302 Thermo-Chemical Ceramics
- 3 - C M E 304 Experimental Design
- 3 - CH 331 Physical Chemistry
- 2 - E C E 307 Basic Electrical Engineering
- 1 - E C E 309 Electrical Engineering Lab. I
- 3 - E M 304 Mechanics of Materials
- 3 - Literature Requirement¹

18

Second Semester

- 2 - C M E 307 Thermal Processing of Ceramics
- 1 - C M E 308 Thermal Proc. of Ceramics Lab.
- 3 - C M E 311 Kinetics of Materials Processes
- 2 - C M E 317 Industrial Fuels and Combustion
- 1 - C M E 318 Combustion Lab.
- 3 - SPCH 250 Public Speaking
- 3 - Humanities/Social Science Requirement²
- 3 - Mathematical Sciences/Statistics Requirement³

18

Senior Year

First Semester

- 3 - C M E 402 Solid State Ceramics
- 3 - C M E 407 Senior Design Project
- 3 - C M E 418 Process Control
- 3 - C M E 450 Safety and Environmental Concerns in Ceramic Manufacturing
- 3 - Humanities/Social Science Requirement²
- 3 - Elective

18

Second Semester

- 3 - C M E 403 Glasses
- 3 - C M E 430 Fine Particle Processing in Ceramic Systems
- 3 - I E 384 Engineering Economic Analysis
- 3 - Humanities/Social Science Requirement²
- 4 - Elective

16

136 Total Semester Hours

¹ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210 or 300-level foreign language literature courses.

²See Policy on Humanities and Social Sciences for Engineering Curricula.

³See advisor.

CHEMICAL ENGINEERING

Bachelor of Science

Chemical Engineering is based on chemistry, physics, and mathematics. The curriculum emphasizes fundamental principles in science and engineering as well as communication skills and humanities. Graduates are avidly sought by industries in many areas of technology such as commodity and specialty chemicals, petrochemicals and petroleum, synthetic fibers and textiles, pharmaceuticals, pulp and paper, computers, foods, metals, ceramics, instrumentation and automatic control, and polymers and plastics. Chemical engineers are in the forefront of environmental pollution prevention and remediation as well as the application of engineering technology to the solution of medical and health-related problems. Advanced structural materials, electronic and photonic devices, and biotechnology are just some of the exciting new fields in which chemical engineers are making pivotal contributions.

A broad, fundamental background prepares chemical engineering graduates for a wide variety of careers in basic research and development, design of new plants, operation and management of production facilities, or technical marketing and sales. Many students use electives, chosen with help of an advisor, to prepare them for entry into professional schools, such as medicine, dentistry, law, or business, or for careers in specialized technical areas. The careers of chemical engineers often lead to top executive positions. The Department of Chemical Engineering offers advanced study leading to the Master of Science and Doctor of Philosophy degrees.

Sophomore Year

First Semester

- 3 - CH 223 Organic Chemistry
- 4 - CH E 211 Intro. to Chemical Engineering
- 2 - E G 209 Intro. to Engr./Comp. Graphics
- 4 - MTHSC 206 Calculus of Several Variables
- 3 - PHYS 221 Physics with Calculus II
- 3 - Literature Requirement¹

19

Second Semester

- 3 - CH 224 Organic Chemistry
- 1 - CH 229 Organic Chemistry Lab.
- 3 - CH E 220 Chemical Engr. Thermodynamics I
- 3 - E M 201 Engineering Mechanics: Statics
- 4 - MTHSC 208 Intro. to Ord. Diff. Equations
- 3 - Literature Requirement¹

17

Junior Year

First Semester

- 1 - CH 339 Physical Chemistry Lab.
- 3 - CH E 311 Fluid Flow
- 3 - CH E 319 Engineering Materials
- 3 - CH E 321 Chemical Engr. Thermodynamics II
- 3 - MTHSC 302 Statistics for Science and Engr. or
- 3 - EX ST 411 Statistical Methods for Process Development Control
- 3 - Humanities/Social Science Requirement¹

- 3 - Elective

19

Second Semester

- 3 - CH 332 Physical Chemistry
- 1 - CH 340 Physical Chemistry Lab.
- 3 - CH E 307 Unit Operation Lab. I
- 3 - CH E 312 Heat and Mass Transfer
- 3 - CH E 353 Process Dynamics and Control
- 3 - Humanities/Social Science Requirement¹

16

Senior Year

First Semester

- 3 - CH E 407 Unit Operations Lab. II
- 3 - CH E 413 Separation Processes
- 3 - CH E 431 Process Development, Design, and Optimization of Chemical Engr. Systems I
- 1 - CH E 443 Chemical Engr. Senior Seminar I
- 3 - CH E 450 Chemical Reaction Engineering
- 3 - Technical Requirement²

16

Second Semester

- 5 - CH E 432 Process Development, Design, and Optimization of Chemical Engr. Systems II
- 1 - CH E 444 Chemical Engr. Senior Seminar II
- 3 - Advanced Chemistry Requirement²
- 3 - Technical Requirement²
- 7 - Elective

19

138 Total Semester Hours

¹See Policy on Humanities and Social Sciences for Engineering Curricula. (Fifteen hours are required. Chemical engineering majors must include six hours selected from ENGL 202, 203, 204, 205, 206, 207, 208, 209, and H210, or from 300-level foreign language literature courses.)

²See advisor.

Note: No student may exceed a maximum of two attempts, including a W, to successfully complete any CH E course.

CIVIL ENGINEERING

Bachelor of Science

Civil Engineering involves the planning, design, construction management, operation, and maintenance of facilities and systems in the built environment. Civil engineering projects include bridges, buildings, airports, water supply systems, ports, dams, and highways.

The Civil Engineering program leads to the Bachelor of Science degree in Civil Engineering and includes the common educational objectives listed on page 73 for the College of Engineering and Science. The first two years provide students with building blocks necessary to be successful civil engineers. This includes proficiency in calculus, statistics, probability, physics, and chemistry. During the junior year, students receive a broad introduction to the fundamental areas of civil engineering (structures, hydraulics, geotechnical, transportation, environmental, construction materials, and project management). Design experiences are integrated throughout the curriculum, culminating in the senior year with a major capstone design project. In addition, during the senior year, students can select from available concentration areas which serve to strengthen their undergraduate background.

This strong program prepares graduates to work immediately upon graduation in most areas of civil en-

gineering or to pursue graduate degrees. Students are also exposed to issues related to professional practice, including professional registration, life-long learning, and communication and team skills. Because a concerned society demands a realistic consideration of the impacts of engineering projects, civil engineering students are also educated in the broad areas of the humanities and social sciences.

Sophomore Year

First Semester

- 3 - C E 251 Analysis Techniques in Civil Engr.
- 2 - C E 253 Civil Engineering Measurements
- 3 - C E 255 Geomatics
- 3 - E M 201 Engineering Mechanics: Statics
- 4 - MTHSC 206 Calculus of Several Variables
- 3 - PHYS 221 Physics with Calculus II

18

Second Semester

- 4 - C E 200 Structural Mechanics
- 2 - E G 209 Intro. to Engr./Comp. Graphics
- 3 - E M 202 Engineering Mechanics: Dynamics
- 4 - MTHSC 208 Intro. to Ord. Diff. Equations
- 3 - SPCH 250 Public Speaking
- 1 - Elective

17

Junior Year

First Semester

- 3 - C E 301 Structural Analysis
- 4 - C E 341 Introduction to Fluid Mechanics
- 3 - C E 351 Civil Engineering Materials
- 2 - C E 352 Economic Evaluation of Projects
- 3 - ENGL 314 Technical Writing
- 3 - EX ST 301 Introductory Statistics

18

Second Semester

- 3 - C E 311 Transportation Engr. Plan. and Design
- 4 - C E 321 Geotechnical Engineering
- 3 - C E 331 Construction Engineering and Mgt.
- 3 - C E 342 Applied Hydraulics and Hydrology
- 1 - C E 353 Professional Seminar
- 3 - EE&S 401 Environmental Engineering

17

Senior Year

First Semester

- 6 - Humanities/Social Science Requirement¹
- 3 - Technical Design Requirement²
- 3 - Technical Requirement³
- 6 - Elective

18

Second Semester

- 3 - C E 459 Capstone Design Project
- 3 - Humanities/Social Science Requirement¹
- 3 - Literature Requirement¹
- 3 - Technical Requirement¹
- 3 - Elective

15

135 Total Semester Hours

¹See policy on Humanities/Social Science Requirements.

²See department policy on Technical Design Requirement.

³See policy on Technical Requirements. Technical Requirements and Electives may be used to complete a concentration area in one of the following fields: Applied Fluid Mechanics,

Construction, Environmental Engineering, Geotechnical/Geoenvironmental Engineering, Structural Engineering.

*Select from sophomore literature courses (200 level only) or foreign language literature (300 level or higher).

Note: Civil Engineering students may neither enroll in nor receive credit for any C/E or E/M courses unless they have a 2.0 engineering GPA and a grade of C or higher in course prerequisites that have a C/E or E/M designation. Exceptions: 1) Students may always re-enroll in C/E courses which they have previously completed with a grade of C or lower, 2) Students need not have a C or higher in 300-level C/E courses to enroll in C/E 459 (see course prerequisites).

COMPUTER ENGINEERING

Bachelor of Science

The program in Computer Engineering leading to the Bachelor of Science degree provides an in-depth education into a wide range of computer topics including computer hardware, software, and applications. Emphasis is placed on hands-on experience with networked computer systems of all sizes (micro, mini, and large) by solving a wide range of real-world problems using engineering principles.

The career opportunities for computer engineers are excellent. The rapid advances in microelectronics and growth of embedded and microcomputer applications, as well as continued expansion of large networked computer systems, indicate that this strong demand will continue.

The curriculum is based on three main concepts. (1) It is an engineering curriculum which provides a solid foundation in mathematics, computer science, basic sciences, and the humanities while emphasizing the engineering approach to problem solving. (2) The required computer courses provide an excellent knowledge of hardware, software, and systems. (3) A large number of elective hours are provided to allow students to specialize in one or more computer areas. The Computer Engineering program prepares students to enter the engineering profession in a rapidly advancing area, and it provides a good background for study in other professions.

Additional information on the Computer Engineering program can be found on our Web site at www.ece.clemson.edu.

Sophomore Year

First Semester

- 4 - CP SC 210 Programming Methodology¹ or
- 4 - CP SC 102 Computer Science II
- 3 - E CE 201 Logic and Computing Devices
- 3 - E CE 202 Electric Circuits I
- 1 - E CE 211 Electrical Engineering Lab. I
- 4 - MTHSC 206 Calculus of Several Variables
- 3 - PHYS 221 Physics with Calculus II

18

Second Semester

- 3 - CP SC 340 Algorithms and Data Structures¹ or
- 4 - CP SC 241 Computer Science IV
- 1 - E CE 212 Electrical Engineering Lab. II
- 3 - E CE 262 Electric Circuits II
- 4 - E CE 272 Computer Organization
- 4 - MTHSC 208 Intro. to Ord. Diff. Equations
- 3 - MTHSC 311 Linear Algebra

18-19

Junior Year

First Semester

- 1 - E CE 311 Electrical Engineering Lab. III
- 3 - E CE 320 Electronics I
- 3 - E CE 329 Computer Systems Structures
- 3 - E CE 330 Signals, Systems, and Transforms
- 4 - E CE 371 Microcomputer Interfacing
- 1 - MTHSC 419 Discrete Math. Structures I
- 3 - Elective

18

Second Semester

- 3 - E CE 352 Programming Systems
- 3 - MTHSC 400 Theory of Probability
- 3 - Engineering Science Requirement²
- 3 - Humanities/Social Science Requirement³
- 3 - Oral Communication Requirement²
- 3 - Elective

18

Senior Year

First Semester

- 3 - E CE 417 Elements of Software Design
- 3 - E CE 426 Digital Computer Design
- 3 - Application Sequence Requirement^{2,4}
- 3 - Design Requirement^{2,4}
- 3 - Humanities/Social Science Requirement³
- 3 - Elective

18

Second Semester

- 3 - E CE 453 Software Practicum
- 3 - Computer Engineering Requirement^{2,4}
- 3 - Design Requirement^{2,4}
- 3 - Humanities/Social Science Requirement³
- 3 - Literature Requirement³
- 3 - Elective

18

140-141 Total Semester Hours

¹CP SC 241 is an approved substitute for CP SC 340. A minor in Computer Science requires CP SC 340. It is recommended that students without a prior programming class enroll in CP SC 101 or 111 in the freshman year to enable enrollment in CP SC 102 or 210 in the first semester of the sophomore year.

²Selected from list of courses approved by the department.

³See Policy on Humanities and Social Sciences for Engineering Curricula.

⁴One course that satisfies either the Design Requirement, Application Sequence Requirement, or Computer Engineering Requirement must also satisfy the Probability and Statistics Requirement (specified by a list of courses approved by the department.)

Notes:

1. A student is allowed to enroll in E CE courses (excluding E CE 307, 308, 309) only when all prerequisites, as defined by current official listings for that course, have been passed with a grade of C or higher.
2. All Computer Engineering students must have a cumulative Engineering grade-point ratio of 2.0 to enroll in any 300- or 400-level E CE courses.
3. No student may exceed a maximum of two attempts, including a W, to successfully complete any E CE course.

ELECTRICAL ENGINEERING

Bachelor of Science

Responsibilities of electrical engineers range from analytical problem solving to the design of components and systems. These activities are performed in a variety of industrial areas and service sectors. The scope of employment opportunities requires a unique breadth and depth of knowledge and technical skills, which are reflected in the Electrical Engineering program. This program also offers an excellent preparation for graduate education.

Building on a foundation of mathematical and physical sciences, students progress into the application of this foundation in the areas of circuits, electronics, computers, communications, controls, power, and electromagnetics. In these areas, students also begin to apply the concepts and techniques being learned to the design of circuits and systems.

In addition to these technical skills, students learn to communicate effectively, both orally and in writing. Because engineers work for the benefit of society, the curriculum includes a strong component of humanities and social science courses. Also, many project design assignments enable the development of interpersonal, teamwork, and management skills which are necessary for success in a professional engineering career.

An array of senior technical design courses in communications and signal processing, controls and robotics, electrical power systems, electromagnetics, electronics, and computer applications offers the opportunity to build depth in a selected area.

Additional information on the program can be found on our Web site at www.ece.clemson.edu.

Sophomore Year

First Semester

- 3 - CP SC 111 Elem. Computer Prog. in C/C++
- 3 - E CE 201 Logic and Computing Devices
- 3 - E CE 202 Electric Circuits I
- 1 - E CE 211 Electrical Engineering Lab. I
- 4 - MTHSC 206 Calculus of Several Variables
- 3 - PHYS 221 Physics with Calculus II

17

Second Semester

- 1 - E CE 212 Electrical Engineering Lab. II
- 3 - E CE 262 Electric Circuits II
- 3 - E CE 272 Computer Organization
- 3 - EM 201 Engineering Mechanics: Statics
- 4 - MTHSC 208 Intro. to Ord. Diff. Equations
- 3 - Elective

18

Junior Year

First Semester

- 1 - E CE 311 Electrical Engineering Lab. III
- 3 - E CE 320 Electronics I
- 3 - E CE 330 Signals, Systems, and Transforms
- 4 - E CE 371 Microcomputer Interfacing
- 3 - E CE 380 Electromagnetics
- 3 - Technical Requirement (Advanced Mathematics)¹

17

Second Semester

- 1 - ECE 312 Electrical Engineering Lab. IV
- 3 - ECE 317 Random Signal Analysis
- 3 - ECE 321 Electronics II
- 3 - ECE 360 Electrical Power Engineering
- 3 - ECE 381 Field, Waves, and Circuits
- 3 - Humanities/Social Science Requirement²

16

Senior Year**First Semester**

- 3 - ECE 409 Continuous and Discrete Syst. Des.
- 3 - ECE 427 Communication Systems
- 2 - ECE 495 Integrated System Design I
- 3 - ME 310 Thermodynamics and Heat Transfer
- 3 - Literature Requirement²
- 3 - Technical Requirement (Electrical and Computer Engineering)¹

17

Second Semester

- 2 - ECE 496 Integrated System Design II
- 6 - Humanities/Social Science Requirement²
- 3 - Technical Requirement (Electrical and Computer Engineering)¹

7 - Elective

18

135 Total Semester Hours

¹Select from list maintained in the Electrical Engineering Program Office.²See Policy on Humanities and Social Sciences for Engineering Curricula.**Notes:**

1. A student is allowed to enroll in ECE courses (excluding ECE 307, 308, 309) only when all prerequisites have been passed with a grade of C or higher.
2. All Electrical Engineering students must have a cumulative Engineering grade-point ratio of 2.0 to enroll in any 300- or 400-level ECE courses. In addition, no student may exceed a maximum of two attempts, including a W, to successfully complete any ECE course.

ENGINEERING ANALYSIS**Bachelor of Science**

This non-accredited course of study is closed to new students. The 139-credit curriculum includes a minimum of 16 credits of basic science (chemistry and physics); 24 credits of mathematics; 33 credits of engineering science; 32 credits in the humanities and social sciences; and a 12-credit area of concentration. Courses must be selected to meet all general education and common engineering requirements. Details are available in the Office of the Associate Dean for Undergraduate Studies (107 Riggs).

INDUSTRIAL ENGINEERING**Bachelor of Science**

Industrial engineers design, install, and improve the complex systems which provide goods and services vital to our society and economy. These systems integrate people, materials, and equipment, and thereby place unique demands for breadth of preparation on industrial engineers. Knowledge is required in mathematical, physical, and social sciences; economic, operational, and engineering analyses; and the principles and techniques of engineering design. Because

industrial engineering problems relate closely to management, industrial engineers need to be able to work and communicate well with managers.

The traditional arenas for the practice of industrial engineering are the manufacturing facilities of industry; however, fully one-third of practicing industrial engineers today are employed in non-manufacturing institutions such as hospitals and banks and in government service. The department emphasizes quality, ergonomics, and design in these non-traditional areas, as well as the changing manufacturing world, in preparing students both for professional practice and further study.

In addition to numerous employment opportunities, industrial engineering graduates may further their formal education. The Department of Industrial Engineering offers programs leading to the Master of Science and Doctor of Philosophy degrees.

Current curriculum and department information is available online at <http://www-ie.ces.clemson.edu>.

Sophomore Year**First Semester**

- 3 - CME 210 Introduction to Materials Science
- 2 - EG 209 Intro. to Engr./Comp. Graphics
- 4 - IE 201 Systems Design I
- 4 - MTHSC 206 Calculus of Several Variables
- 3 - PHYS 221 Physics with Calculus II

2 - Elective

18

Second Semester

- 3 - EM 201 Engineering Mechanics: Statics
- 4 - IE 210 Design and Analysis of Work Systems
- 4 - MTHSC 208 Intro. to Ord. Diff. Equations
- 3 - MTHSC 302 Statistics for Science and Engr.
- 3 - SPCH 250 Public Speaking

17

Junior Year**First Semester**

- 3 - EM 304 Mechanics of Materials¹
- 3 - IE 320 Design of Information Systems in Industrial Engineering
- 3 - IE 380 Methods of Operational Research I
- 3 - IE 384 Engineering Economic Analysis
- 3 - ME 310 Thermodynamics and Heat Transfer

2 - Elective

17

Second Semester

- 2 - ECE 307 Basic Electrical Engineering
- 1 - ECE 309 Electrical Engineering Lab. I
- 3 - ENGL 314 Technical Writing
- 3 - IE 340 Systems and Flow
- 4 - IE 361 Industrial Quality Control
- 3 - IE 381 Methods of Operational Research II

16

Senior Year**First Semester**

- 3 - IE 461 Quality Engineering
- 3 - IE 482 Systems Modeling
- 3 - IE 486 Production Planning and Control
- 3 - Humanities/Social Science Requirement²
- 3 - Literature Requirement¹

15

Second Semester

- 3 - IE 467 Systems Design II
- 1 - IE 468 Design Problems in Industrial Engr.
- 6 - Humanities/Social Science Requirement²
- 6 - Elective

16

131 Total Semester Hours

¹ME 202 or CE 200 may be substituted.²See advisor.³Select from sophomore literature (200 level only) or foreign language literature (300 level or higher).**Notes:**

1. *Baccalaureate Degree Requirement*—In each IE course taken, a student must make a grade of C or higher.
2. *Course Enrollment Requirement*—A student is allowed to enroll in IE courses only when all prerequisites, as defined by the current official listings for those courses, have been passed with a grade of C or higher.

MECHANICAL ENGINEERING**Bachelor of Science**

Breadth, individuality, and flexibility are inherent characteristics of the mechanical engineering profession. Mechanical engineers, in a broad sense, make major contributions to the creation of products and systems that benefit mankind. They work in a variety of areas including bioengineering, energy systems, environmental and life-support systems, propulsion and transportation systems, food production, materials processing, automated manufacturing, and construction. A wide spectrum of career opportunities is open to them.

The practice of mechanical engineering includes one or more of the following activities: manufacturing, testing, research, development, design, technical management, technical sales and marketing, construction, and teaching.

Preparation for a 40–45 year professional career requires development of the whole person through a balanced program encompassing the humanities, social sciences, communication and computer skills, physical and engineering sciences, design, and laboratory experience. Students start with the physical sciences and communication skills and progress through the engineering sciences, ultimately applying the principles learned in such areas as energy conversion and transfer, mechanical design, and systems analysis. Throughout the curriculum, the fundamental nature of engineering as a problem-solving discipline is emphasized.

Most graduates take positions in industry, government, or business. Many, however, continue their formal education in a graduate program. The Department of Mechanical Engineering offers study leading to the Master of Engineering, Master of Science, and Doctor of Philosophy degrees.

Additional information can be found on our Web site at www.eng.clemson.edu/~mechengr/me.html.

Sophomore Year**First Semester**

- 2 - EG 209 Intro. to Engr./Comp. Graphics
- 3 - EM 201 Engineering Mechanics: Statics
- 3 - ME 202 Foundations of Mechanical Systems

- 4 - MTHSC 206 Calculus of Several Variables
- 3 - PHYS 221 Physics with Calculus II
- 3 - Humanities/Social Science Requirement¹

18

Second Semester

- 2 - E C E 307 Basic Electrical Engineering
- 1 - E C E 309 Electrical Engineering Lab. I
- 3 - E M 202 Engineering Mechanics: Dynamics
- 3 - M E 203 Found. of Thermal and Fluid Syst.
- 2 - M E 205 Computer Analysis in Engineering
- 1 - M E 221 Mechanical Engineering Lab. I
- 4 - MTHSC 208 Intro. to Ord. Diff. Equations

16

Junior Year**First Semester**

- 3 - E M 304 Mechanics of Materials
- 3 - E M 320 Fluid Mechanics
- 3 - EX ST 411 Statistical Methods for Process Development and Control or
- 3 - MTHSC 302 Stats. for Science and Eng.
- 3 - M E 303 Thermodynamics
- 2 - M E 322 Mechanical Engineering Lab. II
- 3 - Humanities/Social Science Requirement¹

17

Second Semester

- 3 - M E 301 Materials for Mechanical Engineering Applications
- 3 - M E 304 Heat Transfer
- 3 - M E 305 Modeling and Analysis of Dynamic Systems
- 3 - M E 306 Fundamentals of Machine Design
- 2 - M E 323 Mechanical Engineering Lab. III
- 3 - Elective

17

Senior Year**First Semester**

- 3 - M E 401 Mechanical Engineering Design
- 3 - M E 404 Manufacturing Processes and Their Application
- 1 - M E 424 Mechanical Engineering Lab. IV
- 3 - Literature Requirement²
- 3 - Technical Requirement³
- 4 - Elective

17

Second Semester

- 1 - M E 400 Senior Seminar
- 3 - M E 402 Internship in Engineering Design
- 3 - Humanities/Social Science Requirement¹
- 6 - Technical Requirement³
- 3 - Elective

16

133 Total Semester Hours

¹Select from a list of approved Humanities/Social Science courses.

²Select from 200-level literature or 300-level and higher foreign language literature courses.

³Select from the departmental list of approved courses with the assistance of a faculty advisor.

Note: A student is allowed to enroll in any M E or E M course only when all prerequisites, as defined by current official listings for that course, have been passed with a grade of C or higher.

SCIENCE PROGRAMS

The College offers curricula leading to the Bachelor of Science in Chemistry, Computer Information Systems, Computer Science, Geology, Mathematical Sciences, and Physics. The Bachelor of Arts is offered with a major in Chemistry, Computer Science, Geology, Mathematical Sciences, and Physics.

The science departments in the College work closely with the other academic departments in the University, including such disciplines as economics and management as well as engineering. This allows students in the sciences great flexibility and responsibility in designing their own programs.

Bachelor of Science Curricula

The Bachelor of Science degree prepares the graduate for professional employment or graduate study in the chosen science discipline. BS curricula are thus more highly structured than BA curricula, but nonetheless offer ample opportunity for students to pursue a minor or secondary area of interest.

Bachelor of Arts Curricula

The curricula leading to the Bachelor of Arts degree are designed to meet the needs of students who desire a broad general education. They require a minor (or a second major) as well as the major concentration. A major concentration requires a minimum of 24 credits from courses above the sophomore level including or in addition to courses specified by the major department. In some major disciplines, certain prescribed courses at the sophomore level are counted toward the 24 credit requirement.

Students have a large degree of flexibility and responsibility in designing the minor area from any undergraduate minor listed on pages 34-37. The courses for these minors are to be selected in consultation with the appropriate department.

CHEMISTRY**Bachelor of Science**

Chemistry, an experimental discipline based on observation guided by molecular theory, is of fundamental importance in much of modern science and technology. Its molecular concepts form the basis for ideas about complex material behavior. Due to the fundamental nature and extensive application of chemistry, an unusually large variety of challenging opportunities to contribute in the science-oriented community are open to students whose education is built around the principles of this discipline.

The curriculum, through the career requirement options and the large number of electives, provides students the opportunity to select a coherent program of study beyond the basic courses. Career requirement options are provided for students anticipating graduate study in chemistry or related fields; employment following the BS degree in laboratory, production, technical sales, or management positions; professional studies (e.g., medicine); chemical physics; geochemistry; and employment in fields requiring extensive preparation in courses other than sciences (e.g., patent law and technical writing). Significant features of the curriculum are the student's extensive participation in experimental work and the opportunity to take part in a research investigation during the junior and senior years.

Freshman Year**First Semester**

- 4 - CH 101 General Chemistry
- 1 - CH 141 Chemistry Orientation
- 3 - CP SC 111 Elem. Computer Prog. in C/C++
- 3 - ENGL 101 Composition I
- 4 - MTHSC 106 Calculus of One Variable I

15

Second Semester

- 4 - CH 102 General Chemistry
- 2 - CH 205 Intro. to Inorganic Chemistry
- 1 - CH 206 Inorganic Chemistry Lab.
- 3 - ENGL 102 Composition II
- 4 - MTHSC 108 Calculus of One Variable II
- 3 - PHYS 122 Physics with Calculus I

17

Sophomore Year**First Semester**

- 3 - CH 223 Organic Chemistry
- 1 - CH 227 Organic Chemistry Lab.
- 4 - MTHSC 206 Calculus of Several Variables
- 3 - PHYS 121 Physics with Calculus II
- 1 - PHYS 223 Physics Lab. II
- 4 - Foreign Language Requirement¹

16

Second Semester

- 3 - CH 224 Organic Chemistry
- 1 - CH 228 Organic Chemistry Lab.
- 4 - MTHSC 208 Intro. to Ord. Diff. Equations
- 3 - PHYS 222 Physics with Calculus III
- 1 - PHYS 224 Physics Lab. III
- 4 - Foreign Language Requirement¹

16

Junior Year**First Semester**

- 3 - CH 313 Quantitative Analysis
- 2 - CH 315 Quantitative Analysis Lab.
- 3 - CH 331 Physical Chemistry
- 1 - CH 339 Physical Chemistry Lab.
- 3 - Literature Requirement²
- 3 - Humanities Requirement³
- 3 - Oral Communication Requirement⁴

18

Second Semester

- 3 - CH 332 Physical Chemistry
- 1 - CH 340 Physical Chemistry Lab.
- 3 - CH 411 Instrumental Analysis
- 2 - CH 412 Instrumental Analysis Lab.
- 3 - ENGL 314 Technical Writing
- 3 - Social Science Requirement³

15

Senior Year**First Semester**

- 3 - CH 402 Inorganic Chemistry
- 3 - CH 443 Research Problems
- 3 - Chemistry Requirement⁵
- 3 - Social Science Requirement³
- 6 - Elective

18

Second Semester

- 3 - CH 444 Research Problems
- 3 - Chemistry Requirement³
- 9 - Elective

15

130 Total Semester Hours¹Two semesters of the same modern language.²ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.³See General Education Requirements. See also other college requirements.⁴SPCH 150, 250, 251, or as approved by advisor.⁵See advisor. CH 421 and 435 are recommended for students qualifying for graduate studies.**CHEMISTRY****Bachelor of Arts****Freshman Year****First Semester**

- 4 - CH 101 General Chemistry
- 1 - CH 141 Chemistry Orientation
- 3 - CP SC 111 Elem. Computer Prog. in C/C++
- 3 - ENGL 101 Composition I
- 4 - MTHSC 106 Calculus of One Variable I

15

Second Semester

- 4 - CH 102 General Chemistry
- 2 - CH 205 Introduction to Inorganic Chemistry
- 3 - ENGL 102 Composition II
- 4 - MTHSC 108 Calculus of One Variable II
- 3 - PHYS 122 Physics with Calculus I

16

Sophomore Year**First Semester**

- 3 - CH 223 Organic Chemistry¹
- 1 - CH 227 Organic Chemistry Lab.¹
- 4 - MTHSC 206 Calculus of Several Variables
- 3 - PHYS 221 Physics with Calculus II
- 4 - Foreign Language Requirement²

15

Second Semester

- 3 - CH 224 Organic Chemistry¹
- 1 - CH 228 Organic Chemistry Lab.¹
- 3 - HIST 172 Western Civilization
- 4 - Foreign Language Requirement²
- 3 - Literature Requirement³
- 3 - Elective

17

Junior Year**First Semester**

- 3 - CH 313 Quantitative Analysis
- 1 - CH 317 Quantitative Analysis Lab.
- 3 - HIST 173 Western Civilization
- 3 - Foreign Language Requirement²
- 3 - Humanities Requirement⁴
- 3 - Minor⁵

16

Second Semester

- 3 - CH 331 Physical Chemistry
- 3 - ENGL 314 Technical Writing
- 3 - Foreign Language Requirement²
- 3 - Minor⁵

3 - Oral Communication Requirement⁶**3 - Elective**

18

Senior Year**First Semester**

- 3 - CH 332 Physical Chemistry
- 3 - Chemistry Requirement⁷
- 3 - Minor⁸
- 9 - Elective

18

Second Semester

- 3 - Chemistry Requirement⁷
- 3 - Minor⁸
- 9 - Elective

15

130 Total Semester Hours¹CH 223, 224, 227, 228 will count toward the 24 hours of the Chemistry major.²Four semesters of the same modern language.³ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.⁴See General Education Requirements.⁵See University minors on pages 30-37.⁶SPCH 150, 250, 251, or as approved by advisor.⁷See advisor.**COMPUTER****INFORMATION SYSTEMS****Bachelor of Science**

The Computer Information Systems degree program is oriented toward computer applications in management-related problems. The program emphasizes functional areas of management including accounting, production, marketing and finance, and the applications of computers in these areas. The curriculum is designed to prepare students for careers in areas such as systems design and analysis, applications programming, database administration, and information retrieval as well as for continued study toward an advanced degree.

Students who change majors into Computer Information Systems must have a cumulative grade-point ratio of 2.0 or better.

Additional information can be found on our Web site at www.cs.clemson.edu.

Freshman Year**First Semester**

- 4 - CP SC 101 Computer Science I
- 3 - ENGL 101 Composition I
- 4 - MTHSC 106 Calculus of One Variable I
- 3 - Humanities Requirement E.2¹
- 3 - Social Science Requirement¹

17

Second Semester

- 4 - CP SC 102 Computer Science II
- 3 - ENGL 102 Composition II
- 4 - MTHSC 108 Calculus of One Variable II
- 3 - Natural Science Requirement²
- 3 - Social Science Requirement¹

17

Sophomore Year**First Semester**

- 1 - CP SC 221 Intro. to a Comp. Sci. Language
- 4 - CP SC 231 Computer Science III
- 3 - ECON 211 Principles of Microeconomics
- 3 - MTHSC 119 Intro. to Discrete Methods
- 3 - Literature Requirement³
- 4 - Natural Science Requirement²

18

Second Semester

- 3 - ACCT 203 Financial Accounting
- 4 - CP SC 241 Computer Science IV
- 1 - CP SC 291 Seminar in Professional Issues I
- 3 - MGT 301 Principles of Management
- 3 - MTHSC 210 Applied Matrix Algebra or
- 3 - MTHSC 311 Linear Algebra
- 4 - Natural Science Requirement²

18

Junior Year**First Semester**

- 3 - ACCT 307 Managerial Accounting
- 3 - CP SC 360 Peripherals and File Design
- 3 - MKT 301 Principles of Marketing
- 3 - MTHSC 301 Stat. Theory and Methods I or
- 3 - MTHSC 302 Stats. for Science and Engr.
- 3 - SPCH 250 Public Speaking

15

Second Semester

- 3 - CP SC 332 Computer Systems⁴
- 1 - CP SC 361 Data Management Systems Lab.
- 3 - CP SC 372 Intro. to Software Development
- 3 - ENGL 314 Technical Writing
- 3 - FIN 306 Corporation Finance
- 3 - Elective

16

Senior Year**First Semester**

- 3 - CP SC 371 Systems Analysis
- 3 - CP SC 462 Database Management Systems
- 1 - CP SC 491 Seminar in Professional Issues II
- 3 - MGT 390 Operations Management
- 3 - MGT 400 Mgt. of Organizational Behavior
- 3 - Elective

16

Second Semester

- 3 - CP SC 463 Online Systems
- 3 - MA SC 312 Decision Models for Management
- 3 - Computer Science Requirement⁵
- 3 - Humanities/Social Science Requirement¹
- 4 - Elective

16

133 Total Semester Hours¹See General Education Requirements.²Must include one of the following sequences: BIOL 103/104; CH 101/102, 105/106; PHYS 122/124 and 221/223, 207/208.³ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.⁴For a stronger emphasis on operating systems, CP SC 422 may be substituted for CP SC 332.⁵Select from CP SC 330, 350, or any 400-level CP SC course except 422.

Notes:

1. For graduation, a candidate for the BS degree in Computer Information Systems must have earned a grade of C or better in each CP SC course applied to the degree.
2. Before enrolling in a CP SC course, a grade of C or better must be earned in all prerequisite courses (including CP SC, E C E, and MTHSC courses).

COMPUTER SCIENCE**Bachelor of Science**

The Computer Science degree program is oriented toward design, implementation, and application of software systems to solve information processing problems. An "applications emphasis" in an area outside of computer science allows the program to be tailored to the needs and interests of individual students. This curriculum is more technically oriented than the Computer Information Systems curriculum. It prepares students for employment in the computer software field or for continued study toward an advanced degree in computer science.

This program is accredited by the Computer Science Accreditation Commission of the Computing Sciences Accreditation Board.

Students who change majors into Computer Science must have a cumulative grade-point ratio of 2.0 or better.

Additional information can be found on our Web site at www.cs.clemson.edu.

Freshman Year**First Semester**

- 4 - CP SC 101 Computer Science I
- 3 - ENGL 101 Composition I
- 4 - MTHSC 106 Calculus of One Variable I
- 3 - Humanities Requirement E.2¹
- 3 - Social Science Requirement¹

17

Second Semester

- 4 - CP SC 102 Computer Science II
- 3 - ENGL 102 Composition II
- 4 - MTHSC 108 Calculus of One Variable II
- 3 - Natural Science Requirement²
- 3 - Social Science Requirement¹

17

Sophomore Year**First Semester**

- 1 - CP SC 221 Intro. to a Comp. Sci. Language
- 4 - CP SC 231 Computer Science III
- 3 - MTHSC 119 Intro. to Discrete Methods
- 3 - PHYS 122 Physics with Calculus I
- 1 - PHYS 124 Physics Lab. I
- 3 - Literature Requirement¹
- 3 - Elective

18

Second Semester

- 4 - CP SC 241 Computer Science IV
- 1 - CP SC 291 Seminar in Professional Issues I
- 3 - E C E 201 Logic and Computing Devices
- 3 - MTHSC 311 Linear Algebra
- 3 - PHYS 221 Physics with Calculus II
- 1 - PHYS 223 Physics Lab. II
- 3 - SPCH 250 Public Speaking

18

Junior Year**First Semester**

- 4 - CP SC 330 Computer Systems Organization
- 3 - CP SC 360 Peripherals and File Design
- 3 - MTHSC 301 Stat. Theory and Methods I or 3 - MTHSC 302 Stats. for Science and Engr.
- 3 - Applications Emphasis⁴
- 3 - Natural Science Requirement²

16

Second Semester

- 3 - CP SC 350 Foundations of Computer Science
- 3 - CP SC 372 Intro. to Software Development
- 3 - ENGL 314 Technical Writing
- 3 - Applications Emphasis⁴
- 3 - Mathematical Sciences Requirement⁵

15

Senior Year**First Semester**

- 3 - CP SC 422 Introduction to Operating Systems
- 3 - CP SC 428 Design and Implementation of Programming Languages
- 1 - CP SC 491 Seminar in Professional Issues II
- 3 - Applications Emphasis⁴
- 3 - Computer Science Requirement⁶
- 3 - Elective

16

Second Semester

- 3 - Applications Emphasis⁴
- 3 - Computer Science Requirement⁶
- 3 - Humanities/Social Sciences Requirement¹
- 3 - Nontechnical Requirement⁷
- 4 - Elective

16

133 Total Semester Hours

¹See General Education Requirements.

²Select from the departmental list.

³ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.

⁴Twelve hours in an applications area as specified by the department.

⁵Select from MTHSC 400, 405, 440, 441, 460 or other approved 400-level MTHSC courses.

⁶Select from 400-level CP SC courses. One course must be chosen from CP SC 411, 429, 462, and 472.

⁷Select from departmental list.

Notes:

1. For graduation, a candidate for the BS degree in Computer Science must have earned a grade of C or better in each CP SC course applied to the degree.
2. A grade of C or better must be earned in all prerequisite courses (including CP SC, E C E, and MTHSC courses) before enrolling in the next CP SC course.

COMPUTER SCIENCE**Bachelor of Arts**

The Bachelor of Arts in Computer Science is ideal for students interested in acquiring a broad-based liberal arts education that includes a strong and solid understanding of computer science. The curriculum is oriented toward design, implementation, and application of computer software systems to solve information processing problems. The program prepares students for employment in the computer software field or for continued study toward an advanced degree in computer science.

Students who change majors into Computer Science must have a cumulative grade-point ratio of 2.0 or better.

Additional information can be found on our Web site at www.cs.clemson.edu.

Freshman Year**First Semester**

- 4 - CP SC 101 Computer Science I
- 3 - ENGL 101 Composition I
- 4 - MTHSC 106 Calculus of One Variable I
- 4 - Foreign Language Requirement¹

15

Second Semester

- 4 - CP SC 102 Computer Science II
- 3 - ENGL 102 Composition II
- 3 - HIST 172 Western Civilization
- 4 - MTHSC 108 Calculus of One Variable II
- 4 - Foreign Language Requirement¹

18

Sophomore Year**First Semester**

- 1 - CP SC 221 Intro. to a Comp. Sci. Language
- 4 - CP SC 231 Computer Science III
- 3 - MTHSC 119 Intro. to Discrete Methods
- 3 - Foreign Language Requirement¹
- 3 - Literature Requirement²
- 4 - Science Requirement³

18

Second Semester

- 4 - CP SC 241 Computer Science IV
- 1 - CP SC 291 Seminar in Professional Issues I
- 3 - HIST 173 Western Civilization
- 3 - Foreign Language Requirement¹
- 3 - Literature Requirement²
- 4 - Science Requirement³

18

Junior Year**First Semester**

- 3 - CP SC 360 Peripherals and File Design
- 3 - ENGL 314 Technical Writing
- 3 - MTHSC 301 Stat. Theory and Methods I or 3 - MTHSC 302 Stats. for Science and Engr. or 3 - MTHSC 311 Linear Algebra
- 3 - Computer Science Requirement⁴
- 3 - Minor

15

Second Semester

- 3 - CP SC 372 Intro. to Software Development
- 3 - SPCH 250 Public Speaking
- 3 - Computer Science Requirement⁴
- 6 - Minor

15

Senior Year**First Semester**

- 6 - Computer Science Requirement⁴
- 3 - Departmental Requirement⁵
- 3 - Fine Arts Requirement⁶
- 3 - Minor

15

Second Semester

- 3 - Computer Science Requirement⁴
 - 3 - Minor
 - 10 - Elective
-
- 16

130 Total Semester Hours¹Four semesters of the same language.²ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.³See advisor. One of the following sequences: BIOL 103/104; CH 101/102, 105/106; PHYS 122/124, 221/223, 207/208.⁴Must include at least nine credit hours chosen from CP SC 350 and 400-level computer science courses.⁵Select from philosophy, anthropology, political science, HIST 198 (three times), 200-level English literature, and 300-level foreign language literature.⁶Select from MUSIC 210, 311, Art and Architectural History.**Notes:**

1. For graduation, a candidate for the BA degree in Computer Science must have earned a grade of C or better in each CP SC course applied to the degree.
2. A grade of C or better must be earned in all prerequisite courses (including CP SC, E C E, and MTHSC courses) before enrolling in the next CP SC course.

GEOLOGY**Bachelor of Science**

Geology involves the physics and chemistry of materials which comprise the earth, but equally important, it considers the development of life on earth. Fundamentally, the chemical, physical, and biological responses to environments on and in the earth must be thoroughly understood so that the historical development of the earth can be deduced, predictions of the future inferred, and natural resources intelligently developed. Industry depends on minerals and rocks; metals have their origin in them as do our chief power sources: coal, petroleum, and radioactive minerals.

Employment opportunities for geologists include such far-reaching fields as mineral-producing industries, railroads, municipalities, engineering firms, and water authorities. It is important, therefore, that a geology education rest on a broad yet rigorous base.

Students pursuing a Bachelor of Science degree in Geology have three study areas from which to choose. The "traditional" curriculum provides the fundamentals of geology and excellent support in the other basic sciences. Students completing this curriculum are prepared for employment or for graduate study in any field of geology. The Environmental Geology study area prepares students for careers in the environmental consulting industry. Students in this study area take 15 credits of Environmental Science Requirement, including at least nine credits from one of three subdisciplines: geology/soil science, biology/ecology, or chemistry/physics. The Engineering Geology study area can be taken by students interested in applying engineering principles to geologic problems. Engineering geologists are increasingly called upon to perform geologic site evaluations for construction projects and to minimize the threat of geologic hazards. The curriculum involves courses in engineering and soil mechanics plus 15 credits of Engineering Geology Requirement selected from courses in civil, environmental systems, and biosystems engineering, or advanced mathematics.

Freshman Year**First Semester**

- 4 - CH 101 General Chemistry
 - 3 - ENGL 101 Composition I
 - 1 - GEOL 100 Current Topics in Geology
 - 4 - MTHSC 106 Calculus of One Variable I
 - 3 - Social Science Requirement¹
-
- 15

Second Semester

- 4 - CH 102 General Chemistry
 - 3 - ENGL 102 Composition II
 - 3 - GEOL 101 Physical Geology
 - 1 - GEOL 103 Physical Geology Lab.
 - 4 - MTHSC 108 Calculus of One Variable II
 - 3 - PHYS 122 Physics with Calculus I
-
- 18

Sophomore Year**First Semester**

- 4 - BIOL 103 General Biology I
 - 4 - GEOL 102 Historical Geology
 - 4 - GEOL 306 Mineralogy
 - 4 - MTHSC 206 Calculus of Several Variables
-
- 16

Second Semester

- 3 - GEOL 310 Optical Mineralogy
 - 3 - SPCH 250 Public Speaking
 - 3 - Computer Skills Requirement¹
 - 3 - Literature Requirement²
 - 3 - Elective
-
- 15

Junior Year**First Semester**

- 3 - ENGL 314 Technical Writing
 - 4 - GEOL 302 Structural Geology
 - 3 - GEOL 314 Sedimentary Petrology
 - 3 - PHYS 221 Physics with Calculus II
 - 3 - Social Science Requirement¹
-
- 16

Second Semester

- 3 - EX ST 301 Introductory Statistics
 - 3 - PHYS 222 Physics with Calculus III
 - 3 - Geology Requirement³
 - 3 - Humanities Requirement¹
 - 3 - Elective
-
- 15

Summer

- 6 - Summer Geology Field Course⁴

Senior Year**First Semester**

- 3 - GEOL 316 Igneous and Metamorphic Petrol.
 - 3 - GEOL 403 Invertebrate Paleontology
 - 3-4 - Technical Requirement³
 - 6-5 - Elective
-
- 15

Second Semester

- 3 - GEOL 413 Stratigraphy
 - 3 - Geology Requirement¹
 - 3-4 - Technical Requirement³
 - 5-4 - Elective
-
- 14

130 Total Semester Hours¹See General Education Requirements.²ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.³Select from 300 or 400-level geology courses.⁴GEOL 475 or select from departmental list.⁵Choose from departmental list of approved courses.**ENGINEERING GEOLOGY STUDY AREA****Freshman Year****First Semester**

- 4 - CH 101 General Chemistry
 - 3 - ENGL 101 Composition I
 - 1 - GEOL 100 Current Topics in Geology
 - 4 - MTHSC 106 Calculus of One Variable I
 - 3 - Social Science Requirement¹
-
- 15

Second Semester

- 4 - CH 102 General Chemistry
 - 3 - ENGL 102 Composition II
 - 3 - GEOL 101 Physical Geology
 - 1 - GEOL 103 Physical Geology Lab.
 - 4 - MTHSC 108 Calculus of One Variable II
 - 3 - PHYS 122 Physics with Calculus I
-
- 18

Sophomore Year**First Semester**

- 4 - GEOL 102 Historical Geology
 - 4 - GEOL 306 Mineralogy
 - 4 - MTHSC 206 Calculus of Several Variables
 - 3 - Literature Requirement²
-
- 15

Second Semester

- 3 - C E 255 Geomatics
 - 3 - CP SC 110 Elementary Computer Prog. or
3 - CP SC 111 Elem. Comp. Prog. in C/C++
 - 4 - MTHSC 208 Intro. to Ord. Diff. Equations
 - 3 - SPCH 250 Public Speaking
 - 3 - Social Science Requirement¹
-
- 16

Junior Year**First Semester**

- 3 - E M 201 Engineering Mechanics: Statics
 - 3 - ENGL 314 Technical Writing
 - 4 - GEOL 302 Structural Geology
 - 3 - PHYS 221 Physics with Calculus II
 - 3 - Engineering Geology Requirement³
-
- 16

Second Semester

- 3 - E M 304 Mechanics of Materials
 - 3 - EX ST 301 Introductory Statistics
 - 3 - GEOL 320 Engineering Geology
 - 3 - Geology Requirement⁴
 - 3 - Humanities Requirement¹
-
- 15

Summer

- 6 - Summer Geology Field Course⁵

Senior Year**First Semester**

- 3 - GEOL 408 Geohydrology
 - 6 - Engineering Geology Requirement¹
 - 6 - Elective
-
- 15

Second Semester

- 3 - GEOL 401 Applied Geophysics
 - 6 - Engineering Geology Requirement¹
 - 5 - Elective
-
- 14

130 Total Semester Hours

¹See General Education Requirements.²ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.³Select from departmental list of approved courses. A minimum of 15 credits is required.⁴Select from 300- or 400-level geology courses.⁵GEOL 475 or select from departmental list of approved summer geology field courses.

ENVIRONMENTAL GEOLOGY STUDY AREA

Freshman Year**First Semester**

- 4 - CH 101 General Chemistry
 - 3 - ENGL 101 Composition I
 - 1 - GEOL 100 Current Topics in Geology
 - 4 - MTHSC 106 Calculus of One Variable I
 - 3 - Social Science Requirement¹
-
- 15

Second Semester

- 4 - CH 102 General Chemistry
 - 3 - ENGL 102 Composition II
 - 3 - GEOL 101 Physical Geology
 - 1 - GEOL 103 Physical Geology Lab.
 - 4 - MTHSC 108 Calculus of One Variable II
 - 3 - PHYS 122 Physics with Calculus I
-
- 18

Sophomore Year**First Semester**

- 4 - BIOL 103 General Biology I
 - 4 - GEOL 102 Historical Geology
 - 4 - GEOL 306 Mineralogy
 - 4 - MTHSC 206 Calculus of Several Variables
-
- 16

Second Semester

- 4 - BIOL 104 General Biology II
 - 3 - EN SP 200 Intro. to Environmental Science
 - 3 - GEOL 310 Optical Mineralogy
 - 3 - Computer Skills Requirement¹
 - 3 - Literature Requirement²
-
- 16

Junior Year**First Semester**

- 4 - GEOL 302 Structural Geology
 - 3 - GEOL 314 Sedimentary Petrology or GEOL 316 Igneous and Metamorphic Petrol.
 - 3 - SPCH 250 Public Speaking
 - 3 - Environmental Science Requirement³
 - 2 - Elective
-
- 15

Second Semester

- 3 - ENGL 314 Technical Writing
 - 3 - EX ST 301 Introductory Statistics
 - 3 - GEOL 300 Environmental Geology
 - 3 - Environmental Science Requirement¹
 - 3 - Humanities Requirement E.2¹
-
- 15

Summer

- 6 - Summer Geology Field Course⁴

Senior Year**First Semester**

- 2 - EN SP 472 Environ. Planning and Control or 3 - LAW 429 Environmental Law and Policy
 - 3 - GEOL 408 Geohydrology
 - 3 - Environmental Science Requirement¹
 - 3 - Social Science Requirement¹
 - 4-3 - Elective
-
- 15

Second Semester

- 3 - EN SP 400 Studies in Environmental Science
 - 6 - Environmental Science Requirement¹
 - 5 - Elective
-
- 14

130 Total Semester Hours

¹See General Education Requirements.²ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.³Select from departmental list of approved courses. A minimum of 15 credits is required.⁴GEOL 475 or select from departmental list of approved summer geology field courses.**GEOLOGY****Bachelor of Arts****Freshman Year****First Semester**

- 4 - CH 101 General Chemistry
 - 3 - ENGL 101 Composition I
 - 1 - GEOL 100 Current Topics in Geology
 - 3 - MTHSC 101 Introduction to Probability or 4 - MTHSC 106 Calculus of One Variable I
 - 4 - Foreign Language Requirement¹
-
- 15-16

Second Semester

- 4 - CH 102 General Chemistry
 - 3 - ENGL 102 Composition II
 - 3 - GEOL 101 Physical Geology
 - 1 - GEOL 103 Physical Geology Lab.
 - 3 - MTHSC 102 Intro. to Math. Analysis or 4 - MTHSC 108 Calculus of One Var. II
 - 4 - Foreign Language Requirement¹
-
- 18-19

Sophomore Year**First Semester**

- 4 - GEOL 102 Historical Geology
 - 4 - GEOL 306 Mineralogy
 - 3 - HIST 172 Western Civilization
 - 3 - Foreign Language Requirement¹
 - 3 - Literature Requirement²
-
- 17

Second Semester

- 3 - HIST 173 Western Civilization
 - 3 - SPCH 250 Public Speaking
 - 3 - Foreign Language Requirement¹
 - 3 - Literature Requirement²
 - 3 - Elective
-
- 15

Junior Year**First Semester**

- 4 - GEOL 302 Structural Geology
 - 3 - Computer Skills Requirement¹
 - 3 - Major⁴
 - 3 - Minor
 - 3 - Elective
-
- 16

Second Semester

- 3 - ENGL 314 Technical Writing
 - 6 - Major⁴
 - 3 - Minor
 - 3 - Elective
-
- 15

Senior Year**First Semester**

- 3 - Major⁴
 - 6 - Minor
 - 3-4 - Technical Requirement³
 - 4-3 - Elective
-
- 16

Second Semester

- 6 - Major⁴
 - 3 - Minor
 - 3-4 - Technical Requirement³
 - 4-3 - Elective
-
- 16

128-130 Total Semester Hours

¹German or French is recommended. Two years of the same language are required.²ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.³See General Education Requirements.⁴Select from any 300- or 400-level geology courses.⁵Choose any two courses from CSENV 202, BIOL 103, 104, CME 210, CH 201, EX ST 301, MTHSC 360, PHYS 122, 221 or 207, 208.

MATHEMATICAL SCIENCES

Bachelor of Science

The Mathematical Sciences curriculum is designed to be versatile. Students obtain a broad knowledge of mathematical concepts and methods that are applicable in sciences, engineering, business, industry, and other professions for which a strong mathematical background is desired. In addition to the basic courses which provide students with necessary mathematical skills, the curriculum allows students in their junior years to select one of five options, providing an introduction to a specific area where mathematics is applied. These options are Applied Analysis, Biology, Computer Science, Operations Research/Management Science, and Statistics.

In addition to the overall goal of preparing students to cope with a variety of mathematical problems,

the curriculum seeks to provide an adequate background for students who plan to pursue graduate study or a positions in business, industry, or government. Students electing the Biology Option will have the necessary preparation for entering medical school. More information about the degree program can be seen at www.math.clemson.edu.

Freshman Year

First Semester

- 3 - ECON 200 Economic Concepts or
- 3 - ECON 211 Principles of Microeconomics
- 3 - ENGL 101 Composition I
- 3 - HIST 172 or 173 Western Civilization
- 4 - MTHSC 106 Calculus of One Variable I
- 4 - Foreign Language Requirement¹

17

Second Semester

- 3 - CP SC 120 Issues in Computers
- 3 - ENGL 102 Composition II
- 4 - MTHSC 108 Calculus of One Variable II
- 3 - MTHSC 129 Problem Solving in Discrete Mathematics
- 4 - Foreign Language Requirement¹

17

Sophomore Year

First Semester

- 4 - MTHSC 206 Calculus of Several Variables
- 1 - MTHSC 250 Intro. to Mathematical Sciences
- 3 - MTHSC 360 Intermediate Math. Computing
- 3 - Literature Requirement²
- 4 - Science Requirement³

15

Second Semester

- 4 - MTHSC 208 Intro. to Ord. Diff. Equations
- 3 - MTHSC 311 Linear Algebra
- 3 - PHYS 122 Physics with Calculus I
- 3 - Literature Requirement²
- 4 - Science Requirement³

17

Junior Year

First Semester

- 3 - MTHSC 302 Statistics for Science and Engr.
- 3 - MTHSC 440 Linear Programming
- 4-3 - Approved Requirement⁴
- 3 - Option
- 3-4 - Science Requirement³

16

Second Semester

- 3 - MTHSC 400 Theory of Probability
- 3 - MTHSC 412 Introduction to Modern Algebra
- 4-3 - Approved Requirement⁴
- 3 - Option
- 3-4 - Science Requirement³

16

Senior Year

First Semester

- 3 - ENGL 314 Technical Writing
- 3 - MTHSC 450 Intro. to Mathematical Models
- 3 - MTHSC 453 Advanced Calculus I or
- 3 - MTHSC 463 Mathematical Analysis I
- 3 - SPCH 250 Public Speaking

4 - Approved Requirement⁴

3 - Option

19

Second Semester

- 3 - MTHSC 454 Advanced Calculus II
- 3 - Option
- 10 - Elective

16

133 Total Semester Hours

OPTIONS

Operations Research/Management Science³

- 3 - IE 482 Systems Modeling or
- 3 - IE 384 Engineering Economic Analysis
- 3 - IE 486 Production Planning and Control or
- 3 - MGT 402 Operations Planning and Cont.
- 3 - MTHSC 407 Regress. and Time-Ser. Analysis
- 3 - MTHSC 441 Intro. to Stochastic Models
- 3 - MTHSC 460 Intro. to Numerical Analysis I

15

Statistics

- 3 - MA SC 414 Statistical Analysis
- 3 - MTHSC 403 Intro. to Statistical Theory
- 3 - MTHSC 406 Sampling Theory and Methods
- 3 - MTHSC 407 Regress. and Time-Ser. Analysis

12

Applied Analysis

- 6 - Applications Area⁵
- 3 - MTHSC 435 Complex Variables
- 3 - MTHSC 460 Intro. to Numerical Analysis I

12

¹Eight semester hours in the same language are required.²ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.³Must include two of the following sequences: BIOL 103/104; CH 101/102; ECON 314/405; PHYS 221/223, 222/224. The Operations Research/Management Science option requires ECON 314/405.⁴Must be approved by the advisor.⁵These courses must be approved by the advisor. Possibilities include CH 331, 332; E M 320; M E 302; MTHSC 457, 458; PHYS 321, 322, 441, 442.

Notes:

1. For graduation, a candidate for the BS degree in Mathematical Sciences will be required to have a 2.0 or higher cumulative grade-point ratio in all required courses taught by the Mathematical Sciences Department including approved mathematical sciences electives and option courses.
2. A grade of C or better must be earned in all prerequisite courses before enrolling in the next MTHSC course.

BIOLOGY OPTION

Freshman Year

First Semester

- 5 - BIOL 110 Principles of Biology I¹
- 3 - CP SC 120 Issues in Computers
- 3 - ENGL 101 Composition I
- 4 - MTHSC 106 Calculus of One Variable I

15

Second Semester

- 5 - BIOL 111 Principles of Biology II¹
- 3 - ENGL 102 Composition II
- 4 - MTHSC 108 Calculus of One Variable II
- 3 - MTHSC 129 Problem Solving in Discrete Mathematics
- 1 - MTHSC 250 Intro. to Mathematical Sciences

16

Sophomore Year

First Semester

- 4 - CH 101 General Chemistry
- 4 - MTHSC 206 Calculus of Several Variables
- 3 - MTHSC 360 Intermediate Math. Computing
- 4 - PHYS 207 General Physics I
- 3 - Literature Requirement²

18

Second Semester

- 4 - CH 102 General Chemistry
- 4 - MTHSC 208 Intro. to Ord. Diff. Equations
- 3 - MTHSC 311 Linear Algebra
- 4 - PHYS 208 General Physics II
- 3 - Literature Requirement²

18

Junior Year

First Semester

- 3 - CH 223 Organic Chemistry
- 1 - CH 227 Organic Chemistry Lab.
- 3 - MTHSC 302 Statistics for Science and Engr.
- 3 - MTHSC 440 Linear Programming
- 4 - Foreign Language Requirement³
- 2 - Elective

16

Second Semester

- 3 - CH 224 Organic Chemistry
- 1 - CH 228 Organic Chemistry Lab.
- 3 - MTHSC 400 Theory of Probability
- 3 - MTHSC 412 Introduction to Modern Algebra
- 4 - Foreign Language Requirement³
- 2 - Elective

16

Senior Year

First Semester

- 3 - ECON 200 Economic Concepts or
- 3 - ECON 211 Principles of Microeconomics
- 3 - MTHSC 450 Intro. to Mathematical Models
- 3 - MTHSC 453 Advanced Calculus I or
- 3 - MTHSC 463 Mathematical Analysis I
- 3 - Animal or Plant Diversity Requirement⁴
- 4 - Elective

16

Second Semester

- 3 - ENGL 314 Technical Writing
- 3 - HIST 172 or 173 Western Civilization
- 3 - MTHSC 454 Advanced Calculus II
- 3 - SPCH 250 Public Speaking
- 4-3 - Biological Science Requirement⁵
- 2-3 - Elective

18

133 Total Semester Hours

¹Those qualifying for advanced placement in languages or wanting to take languages the freshman year may take them in place of these courses.²ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.³Eight semester hours in the same language are required.⁴BIOS 302, 303, 304, 305.⁵Select from BIOCH 301, GEN 302, MICRO 305 or any 300- and 400-level biological science course.

Notes:

1. For graduation, a candidate for the BS degree in Mathematical Sciences will be required to have a 2.0 or higher cumulative grade-point ratio in all required courses taught by the

Mathematical Sciences Department including approved mathematical sciences electives and option courses.

2. A grade of C or better must be earned in all prerequisite courses before enrolling in the next MTHSC course.

COMPUTER SCIENCE OPTION

Freshman Year

First Semester

- 3 - ECON 200 Economic Concepts or
- 3 - ECON 211 Principles of Microeconomics
- 3 - ENGL 101 Composition I
- 3 - HIST 172 or 173 Western Civilization
- 4 - MTHSC 106 Calculus of One Variable I
- 4 - Foreign Language Requirement¹

17

Second Semester

- 3 - CP SC 111 Elem. Computer Prog. in C/C++
- 3 - ENGL 102 Composition II
- 4 - MTHSC 108 Calculus of One Variable II
- 4 - MTHSC 129 Problem Solving in Discrete Mathematics
- 4 - Foreign Language Requirement¹

17

Sophomore Year

First Semester

- 4 - CP SC 210 Programming Methodology
- 4 - MTHSC 206 Calculus of Several Variables
- 1 - MTHSC 250 Intro. to Mathematical Sciences
- 3 - Literature Requirement²
- 4 - Science Requirement³

16

Second Semester

- 3 - CP SC 340 Algorithms and Data Structures
- 4 - MTHSC 208 Intro. to Ord. Diff. Equations
- 3 - MTHSC 311 Linear Algebra
- 3 - Literature Requirement²
- 4 - Science Requirement³

17

Junior Year

First Semester

- 3 - MTHSC 302 Statistics for Science and Engr.
- 3 - MTHSC 360 Intermediate Math. Computing
- 3 - MTHSC 440 Linear Programming
- 3 - PHYS 122 Physics with Calculus I
- 3-4 - Science Requirement³

15-16

Second Semester

- 3 - ENGL 314 Technical Writing
- 3 - MTHSC 400 Theory of Probability
- 3 - MTHSC 412 Introduction to Modern Algebra
- 3 - SPCH 250 Public Speaking
- 3-4 - Computer Science Requirement⁴
- 3-4 - Science Requirement³

18-20

Senior Year

First Semester

- 3 - MTHSC 450 Intro. to Mathematical Models
- 3 - MTHSC 453 Advanced Calculus I or
- 3 - MTHSC 463 Mathematical Analysis I
- 3 - MTHSC 460 Intro. to Numerical Analysis I
- 7-9 - Approved Requirement³

16-18

Second Semester

- 3 - MTHSC 454 Advanced Calculus II
- 3 - Computer Science Requirement⁴
- 10 - Elective

16

132-137 Total Semester Hours

¹Eight semester hours in the same language are required.

²ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.

³Must include two of the following sequences: BIOL 103/104; CH 101/102; ECON 314/405; PHYS 221/223, 222/224.

⁴Choose one of the following sequences: CP SC 231/428; 350/450; 360/462 or any two courses from CP SC 231, 350, 360, or 372.

⁵Must be approved by the advisor.

Notes:

1. For graduation, a candidate for the BS degree in Mathematical Sciences will be required to have a 2.0 or higher cumulative grade-point ratio in all required courses taught by the Mathematical Sciences Department including approved mathematical sciences electives and option courses.
2. A grade of C or better must be earned in all prerequisite courses before enrolling in the next MTHSC course.

MATHEMATICAL SCIENCES

Bachelor of Arts

Freshman Year

First Semester

- 3 - ECON 200 Economic Concepts or
- 3 - ECON 211 Principles of Microeconomics
- 3 - ENGL 101 Composition I
- 3 - HIST 172 Western Civilization
- 4 - MTHSC 106 Calculus of One Variable I
- 4 - Foreign Language Requirement¹

17

Second Semester

- 3 - CP SC 120 Issues in Computers
- 3 - ENGL 102 Composition II
- 4 - MTHSC 108 Calculus of One Variable II
- 3 - MTHSC 129 Problem Solving in Discrete Mathematics
- 4 - Foreign Language Requirement¹

17

Sophomore Year

First Semester

- 4 - MTHSC 206 Calculus of Several Variables
- 1 - MTHSC 250 Intro. to Mathematical Sciences
- 3 - Foreign Language Requirement¹
- 3 - Literature Requirement²
- 4 - Science Requirement³

15

Second Semester

- 4 - MTHSC 208 Intro. to Ord. Diff. Equations
- 3 - MTHSC 311 Linear Algebra
- 3 - Foreign Language Requirement¹
- 3 - Literature Requirement²
- 4 - Science Requirement³

17

Junior Year

First Semester

- 3 - A A H 210 Intro. to Art and Architecture or
- 3 - MUSIC 210 Music Appreciation: Music in the Western World
- 3 - MTHSC 302 Statistics for Science and Engr.
- 3 - SPCH 250 Public Speaking
- 3 - Minor
- 3 - Social Science Requirement³
- 2 - Elective

17

Second Semester

- 3 - HIST 173 Western Civilization
- 3 - MTHSC 400 Theory of Probability
- 3 - MTHSC 412 Introduction to Modern Algebra
- 3 - Minor
- 3 - Social Science Requirement³
- 2 - Elective

17

Senior Year

First Semester

- 3 - MTHSC 440 Linear Programming or
- 3 - MTHSC 450 Intro. to Math. Models
- 3 - MTHSC 453 Advanced Calculus I or
- 3 - MTHSC 463 Mathematical Analysis I
- 6 - Minor
- 3 - Elective

15

Second Semester

- 3 - ENGL 314 Technical Writing
- 3 - MTHSC 454 Advanced Calculus II
- 3 - Humanities Requirement³
- 3 - Mathematical Sciences Requirement⁴
- 3 - Minor
- 3 - Elective

18

133 Total Semester Hours

¹Four semesters of the same language.

²ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.

³Must be approved by advisor.

⁴Select from 300- and 400-level MTHSC courses with approval of advisor.

Notes:

1. For graduation, a candidate for the BA degree in Mathematical Sciences will be required to have a 2.0 or higher cumulative grade-point ratio in all required courses taught by the Mathematical Sciences Department including approved mathematical sciences electives and option courses.
2. A grade of C or better must be earned in all prerequisite courses before enrolling in the next MTHSC course.

PHYSICS

Bachelor of Science

Physics, the most fundamental of the natural sciences, forms the basis upon which the study of other branches of science is founded. Physics is concerned with the fundamental behavior of matter and energy. Classical physics encompasses the fields of mechanics, heat and thermodynamics, electricity and magnetism, acoustics and optics. Modern physics is concerned with the study of atoms and molecules, atomic nuclei, elementary particles and the properties of liquids, crystalline solids, and other materials, as well as the areas of relativity, cosmology, and the large-scale structure of the universe.

The undergraduate Physics curricula are designed to provide students with a strong background in the classical areas of physics as well as an introduction into the more important aspects of modern physics. The BS in Physics curriculum is directed toward preparing students for graduate study ultimately leading to the PhD degree or toward research and development work in industrial or governmental laboratories. It also provides a good background for graduate study or industrial work in many areas of engineering and applied science.

Freshman Year

First Semester

- 4 - CH 101 General Chemistry
- 3 - ENGL 101 Composition I
- 4 - MTHSC 106 Calculus of One Variable I
- 1 - PHYS 101 Current Topics in Modern Physics
- 3 - Social Science Requirement¹

15

Second Semester

- 4 - CH 102 General Chemistry
- 3 - CP SC 120 Issues in Computers
- 3 - ENGL 102 Composition II
- 4 - MTHSC 108 Calculus of One Variable II
- 3 - PHYS 122 Physics with Calculus I
- 1 - PHYS 124 Physics Lab. I

18

Sophomore Year

First Semester

- 4 - MTHSC 206 Calculus of Several Variables
- 3 - PHYS 221 Physics with Calculus II
- 1 - PHYS 223 Physics Lab. II
- 4 - Foreign Language Requirement²
- 3 - Literature Requirement³

15

Second Semester

- 4 - MTHSC 208 Intro. to Ord. Diff. Equations
- 3 - PHYS 222 Physics with Calculus III
- 1 - PHYS 224 Physics Lab. III
- 4 - Foreign Language Requirement²
- 3 - Humanities Requirement¹
- 3 - Elective

18

Junior Year

First Semester

- 3 - PHYS 311 Intro. to Meth. of Theoretical Phys.
- 3 - PHYS 321 Mechanics I
- 3 - PHYS 325 Experimental Physics I
- 3 - Concentration Area⁴
- 3 - Writing Intensive Requirement¹

15

Second Semester

- 3 - PHYS 322 Mechanics II
- 3 - PHYS 326 Experimental Physics II
- 3 - PHYS 355 Modern Physics
- 3 - PHYS 441 Electromagnetics I
- 3 - Concentration Area⁴
- 3 - Elective

18

Senior Year

First Semester

- 3 - PHYS 401 Senior Thesis I
- 3 - PHYS 442 Electromagnetics II
- 3 - PHYS 455 Quantum Physics I
- 3 - Concentration Area⁴
- 3 - Social Science Requirement¹

15

Second Semester

- 3 - PHYS 465 Thermodynamics and Statistical Mechanics
- 3 - Concentration Area⁴
- 3 - Oral Communication Requirement¹
- 3 - Science Requirement⁵
- 4 - Elective

16

130 Total Semester Hours

¹See General Education Requirements. (Social Science requirement must include either HIST 172 or 173.)

²Two semesters in same modern foreign language.

³ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.

⁴The Area of Concentration may be chosen from the following: Chemistry, Computer Science, Engineering, Environmental Science, Geology, Mathematical Science, and Physics and Astronomy. The student will take a total of 12 credits in one of these areas, at least six of which will normally be at the 300-400 level. It should be noted that the requirements for a minor in one of these areas might be satisfied with three additional credits at the 300-400 level.

⁵The Science requirement will be fulfilled by courses in the disciplines listed in (4) above at the 300-400 level in a discipline other than that chosen for the Concentration Area.

BIOPHYSICS OPTION

The Physics-Biophysics Option offers an excellent preparation for medical school or graduate work in biological sciences. It includes the flexibility of selecting courses in chemistry, biological sciences, physics, and mathematics. This option also provides the necessary background for employment in industry, manufacturing, and instrumentation for clinical or molecular biology applications.

Freshman Year

First Semester

- 4 - CH 101 General Chemistry
- 3 - ENGL 101 Composition I
- 4 - MTHSC 106 Calculus of One Variable I
- 1 - PHYS 101 Current Topics in Modern Physics
- 3 - Social Science Requirement¹

15

Second Semester

- 4 - CH 102 General Chemistry
- 3 - CP SC 120 Issues in Computers
- 3 - ENGL 102 Composition II
- 4 - MTHSC 108 Calculus of One Variable II
- 3 - PHYS 122 Physics with Calculus I
- 1 - PHYS 124 Physics Lab. I

18

Sophomore Year

First Semester

- 5 - BIOL 110 Principles of Biology I
- 4 - MTHSC 206 Calculus of Several Variables
- 3 - PHYS 221 Physics with Calculus II
- 1 - PHYS 223 Physics Lab. II
- 3 - Literature Requirement²

16

Second Semester

- 4 - MTHSC 208 Intro. to Ord. Diff. Equations
- 3 - PHYS 222 Physics with Calculus III
- 1 - PHYS 224 Physics Lab. III
- 4 - Biophysics Requirement³
- 3 - Humanities Requirement E.2¹
- 3 - Elective

18

Junior Year

First Semester

- 3 - PHYS 311 Intro. to Meth. of Theoretical Phys.
- 3 - PHYS 321 Mechanics I
- 3 - PHYS 325 Experimental Physics I
- 3 - Biophysics Requirement³
- 4 - Foreign Language Requirement⁴

16

Second Semester

- 3 - PHYS 322 Mechanics II
- 3 - PHYS 355 Modern Physics
- 3 - PHYS 441 Electromagnetics I
- 3 - Biophysics Requirement³
- 4 - Foreign Language Requirement⁴

16

Senior Year

First Semester

- 3 - PHYS 442 Electromagnetics II
- 3 - PHYS 455 Quantum Physics I
- 3 - Biophysics Requirement³
- 3 - Writing Intensive Requirement¹
- 3 - Elective

15

Second Semester

- 3 - PHYS 465 Thermodynamics and Stat. Mech.⁵
- 3 - Biophysics Requirement³
- 3 - Oral Communication Requirement¹
- 3 - Social Science Requirement¹
- 4 - Elective

16

130 Total Semester Hours

¹See General Education Requirements.

²ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.

³Select from an approved course list from offerings in physics, chemistry, mathematics, and the biological sciences. At least six credits must be in the biological sciences.

⁴Two semesters in the same modern foreign language.

⁵An approved physics course may be substituted for PHYS 465 if the student satisfactorily completes CH 331, 332.

PHYSICS

Bachelor of Arts

The BA in Physics program is ideal for students interested in acquiring a broad-based liberal education that includes a strong and solid understanding of science.

Freshman Year

First Semester

- 4 - CH 101 General Chemistry
- 3 - ENGL 101 Composition I
- 4 - MTHSC 106 Calculus of One Variable I
- 1 - PHYS 101 Current Topics in Modern Physics
- 3 - Social Science Requirement¹

15

Second Semester

- 4 - CH 102 General Chemistry
- 3 - CP SC 120 Issues in Computers
- 3 - ENGL 102 Composition II
- 4 - MTHSC 108 Calculus of One Variable II
- 3 - PHYS 122 Physics with Calculus I
- 1 - PHYS 124 Physics Lab. I

18

Sophomore Year**First Semester**

- 4 - MTHSC 206 Calculus of Several Variables
- 3 - PHYS 221 Physics with Calculus II
- 1 - PHYS 223 Physics Lab. II
- 4 - Foreign Language Requirement²
- 3 - Literature Requirement¹

15

Second Semester

- 4 - MTHSC 208 Intro. to Ord. Diff. Equations
- 3 - PHYS 222 Physics with Calculus III
- 1 - PHYS 224 Physics Lab. III
- 4 - Foreign Language Requirement²
- 3 - Humanities Requirement E.2¹

Elective

18

Junior Year**First Semester**

- 3 - PHYS 311 Intro. to Meth. of Theoretical Phys.
- 3 - PHYS 321 Mechanics I
- 3 - Foreign Language Requirement²
- 3 - Minor
- 3 - Writing Intensive Requirement¹

15

Second Semester

- 3 - PHYS 322 Mechanics II
- 3 - PHYS 355 Modern Physics
- 3 - PHYS 441 Electromagnetics I
- 3 - Foreign Language Requirement²
- 3 - Minor

15

Senior Year**First Semester**

- 3 - PHYS 325 Experimental Physics I
- 6 - Minor
- 3 - Physics (as approved)
- 3 - Social Science Requirement¹
- 3 - Elective

18

Second Semester

- 3 - Minor
- 3 - Oral Communication Requirement¹
- 3 - Physics (as approved)
- 3 - Social Science Requirement¹
- 4 - Elective

16

130 Total Semester Hours

¹See General Education Requirements. (Social science requirement must include either HIST 172 or 173.)

²Four semesters in the same modern foreign language.

³ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.

TEXTILE PROGRAMS

Textile students study the production of natural and man-made fibers, the processes for converting these fibers into a textile structure, the science of coloring agents and finishes to improve the desirability and serviceability of the product, and the methods for evaluating the performance of textile materials.

Graduates of the School of Textiles, Fiber, and Polymer Science hold jobs in corporate and personnel management, manufacturing management, design, research, development, technical service, quality control, and sales. They create new products and processes and solve problems. They create styles, patterns, textures, and colors for apparel, home, industry, and special applications. They deal with computers, automation, product quality, plant performance, environmental control, and consumer safety.

The textile industry has a continuing need for technically trained men and women to help the industry reduce costs and increase exports and to develop new fibers and fabrics. In the textiles curricula a broad background is stressed, with as much as two-thirds of the courses coming from the diverse resources of the University outside the School of Textiles, Fiber, and Polymer Science.

The School offers three undergraduate degrees which differ in their focus and the content of their science and business courses. The BS in Textile Chemistry and the BS in Textile Science are both based on chemistry, physics, and mathematics. With this firm base, graduates are able to apply their scientific knowledge to the solution of problems in textile materials involving both chemical and physical principles. These two programs differ in that Textile Chemistry

has a greater emphasis on the chemistry of polymers, fibers, and textile materials; and Textile Science has greater emphasis on fiber, yarn, and fabric formation. Graduates will be concerned with the conception, design, construction, and management of complete systems of labor, machinery, and processes for the most efficient production of textiles or related chemicals. Both curricula allow students to prepare for graduate study in textiles as well as other science and engineering disciplines.

The Bachelor of Science in Textile Management provides students with a balanced combination of the principles and theories of textile manufacturing and management, as well as concentrated studies in related options of the students' choice. This program prepares students for careers in the modern industrial environment and may initially lead to a production management position in the textile industry. This plan of study maximizes students' leadership potential and professional development in their chosen fields.

The School of Textiles, Fiber, and Polymer Science also offers the following advanced degrees: Master of Science in Textile Chemistry, Master of Science in Textile Science, Doctor of Philosophy in Textile and Polymer Science, and, in cooperation with the Chemistry Department, the Doctor of Philosophy in Chemistry with a major in Textile Chemistry.

Additional information is available on the Web at www.ces.clemson.edu/textiles.

Textile courses also may be taken as a minor area or as electives. Recommended groups of courses may consist of 3, 6, 12, or 20 credits.

TEXTILE CHEMISTRY**Bachelor of Science****Freshman Year****First Semester**

- 4 - CH 101 General Chemistry
- 3 - ENGL 101 Composition I
- 4 - MTHSC 106 Calculus of One Variable I
- 3 - TEXT 175 Intro. to Textile Manufacturing
- 3 - History Requirement¹

17

Second Semester

- 4 - CH 102 General Chemistry
- 3 - CP SC 110 Elem. Computer Programming or 3 - CP SC 120 Issues in Computers
- 3 - ENGL 102 Composition II
- 4 - MTHSC 108 Calculus of One Variable II
- 3 - PHYS 122 Physics with Calculus I

17

Sophomore Year**First Semester**

- 3 - CH 223 Organic Chemistry
- 2 - CH 225 Organic Chemistry Lab.
- 4 - MTHSC 206 Calculus of Several Variables
- 3 - PHYS 221 Physics with Calculus II
- 1 - PHYS 223 Physics Lab. II
- 3 - Literature Requirement²

16

Second Semester

- 3 - CH 224 Organic Chemistry
- 2 - CH 226 Organic Chemistry Lab.
- 4 - MTHSC 208 Intro. to Ord. Diff. Equations
- 3 - PHYS 222 Physics with Calculus III
- 1 - PHYS 224 Physics Lab. III
- 3 - Humanities Requirement E.2¹

16

Junior Year**First Semester**

- 3 - CH 331 Physical Chemistry
- 3 - ECON 200 Economic Concepts
- 3 - T C 415 Intro. to Polymer Science and Engr.
- 1 - T C 417 Polymer and Fiber Lab.
- 4 - TEXT 201 Yarn Structure and Form
- 3 - Elective

17

Second Semester

- 3 - CH 332 Physical Chemistry
- 3 - ENGL 314 Technical Writing
- 3 - T C 416 Chemical Preparation of Textiles
- 4 - TEXT 202 Fabric Struc., Design, and Analysis
- 4 - Elective

17

Senior Year**First Semester**

- 3 - T C 457 Dyeing and Finishing I
- 1 - T C 459 Dyeing and Finishing Lab. I
- 3 - TEXT 421 Fiber Science
- 9 - Elective

16

Second Semester

- 3 - SPCH 250 Public Speaking or
 - 3 - SPCH 251 Business and Prof. Speaking
- 3 - T C 458 Dyeing and Finishing II
- 1 - T C 460 Dyeing and Finishing Lab. II
- 3 - TEXT 422 Properties of Textile Structures
- 6 - Elective

16

132 Total Semester Hours¹HIST 101, 102, 172, 173.²ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.³See General Education Requirements.**TEXTILE MANAGEMENT****Bachelor of Science****Freshman Year****First Semester**

- 4 - CH 101 General Chemistry or
 - 4 - CH 105 Beg. Gen. and Organic Chemistry
- 3 - ENGL 101 Composition I
- 3 - MTHSC 102 Intro. to Mathematical Analysis
- 3 - TEXT 175 Intro. to Textile Manufacturing
- 3 - History Requirement¹

16

Second Semester

- 4 - CH 102 General Chemistry or
 - 4 - CH 106 Beg. Gen. and Organic Chemistry
- 3 - CP SC 110 Elem. Computer Programming or
 - 3 - CP SC 120 Issues in Computers
- 3 - ENGL 102 Composition II
- 3 - MTHSC 207 Multivariable Calculus
- 4 - TEXT 176 Natural and Manmade Fibers

17

Sophomore Year**First Semester**

- 3 - ACCT 201 Accounting Concepts I
- 3 - ECON 200 Economic Concepts
- 3 - PSYCH 201 Introduction to Psychology
- 4 - TEXT 201 Yarn Structures and Form
- 3 - Humanities Requirement E.2²

16

Second Semester

- 3 - ACCT 202 Accounting Concepts II
- 3 - MGT 301 Principles of Management
- 3 - SPCH 250 Public Speaking or
 - 3 - SPCH 251 Business and Prof. Speaking
- 4 - TEXT 202 Fabric Struc., Design, and Analysis
- 3 - Literature Requirement³

16

Junior Year**First Semester**

- 3 - FIN 306 Corporation Finance
- 3 - LAW 322 Legal Environment of Business
- 3 - MKT 301 Principles of Marketing
- 3 - Area of Study⁴
- 4 - Special Interest Area⁵

16

Second Semester

- 3 - ENGL 314 Technical Writing
- 3 - MGT 307 Personnel Management
- 3 - Area of Study⁴
- 7 - Special Interest Area⁵

16

Senior Year**First Semester**

- 3 - TEXT 324 Textile Statistics
- 3 - TEXT 470 Text. Cost. and Inventory Control
- 3 - Area of Study⁴
- 6-7 - Special Interest Area⁵
- 3 - Elective

18-19

Second Semester

- 3 - MGT 415 Business Strategy
- 3 - Area of Study⁴
- 4-3 - Special Interest Area⁵
- 7 - Elective

17-16

132 Total Semester Hours¹HIST 101, 102, 172, or 173.²See General Education Requirements.³ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.⁴Area of Study—A minimum of 12 credits must be selected with at least nine credits from any one of the following:

Personnel—ECON 301, 308, LAW 312, 313, 401, MGT 400, 416.

Markets and Marketing—ECON 314, 412, MKT 302, 423, 424, 426, 431, 450, TEXT 472.

Industrial Engineering—E G 209, I E 488, MGT 402, 408.

Product Development and Merchandising—TEXT 333, 472, 475, MKT 302, 423, 425.

Science—T C 303/305, 304/306, MTHSC 106, 108, 206, 208, PHYS 122, 221, 222, 223, 224.

Computer Science—CP SC 130, 210, 330, 360, 462, MGT 218, 299, TEXT 420.

Textile Specialties—TEXT 414, 416, 421, 471, 475, 476.

⁵Special Interest Area—For either Interest Area, Chemical or Manufacturing, the listed 21 hours are required:

Chemical—T C 303/305, 304/306, 405, 406, 416, 457/459.

Manufacturing—TEXT 308, 314, 403, 411, 422, 426, 429.

TEXTILE SCIENCE**Bachelor of Science****Freshman Year****First Semester**

- 4 - CH 101 General Chemistry
- 3 - ENGL 101 Composition I
- 4 - MTHSC 106 Calculus of One Variable I
- 3 - TEXT 175 Intro. to Textile Manufacturing
- 3 - History Requirement¹

17

Second Semester

- 4 - CH 102 General Chemistry
- 3 - CP SC 110 Elem. Computer Programming or
 - 3 - CP SC 120 Issues in Computers
- 3 - ENGL 102 Composition II
- 4 - MTHSC 108 Calculus of One Variable II
- 3 - PHYS 122 Physics with Calculus I

17

Sophomore Year**First Semester**

- 4 - MTHSC 206 Calculus of Several Variables
- 3 - PHYS 221 Physics with Calculus II
- 1 - PHYS 223 Physics Lab. II
- 3 - TEXT 301 Fiber Processing I
- 3 - Literature Requirement²
- 1 - Elective

15

Second Semester

- 3 - ECON 200 Economic Concepts
- 4 - MTHSC 208 Intro. to Ord. Diff. Equations
- 3 - PHYS 222 Physics with Calculus III
- 1 - PHYS 224 Physics Lab. III
- 3 - TEXT 302 Fiber Processing II
- 3 - Elective

17

Junior Year**First Semester**

- 3 - T C 303 Textile Chemistry
- 1 - T C 305 Textile Chemistry Lab.
- 3 - TEXT 311 Fabric Development I
- 3 - TEXT 421 Fiber Science
- 5 - Approved Requirement³
- 3 - Humanities Requirement E.2⁴

18

Second Semester

- 3 - ENGL 314 Technical Writing
- 3 - T C 304 Textile Chemistry
- 1 - T C 306 Textile Chemistry Lab.
- 3 - TEXT 312 Fabric Development II
- 3 - TEXT 422 Properties of Textile Structures
- 3 - Elective

16

Senior Year**First Semester**

- 3 - T C 415 Intro. to Polymer Science and Engng.
- 1 - T C 417 Polymer and Fiber Lab.
- 3 - T C 457 Dyeing and Finishing I
- 1 - T C 459 Dyeing and Finishing Lab. I
- 3 - TEXT 403 Fiber Processing III
- 3 - TEXT 411 Fabric Development III
- 3 - Approved Requirement³

17

Second Semester

- 3 - SPCH 250 Public Speaking or
 - 3 - SPCH 251 Business and Prof. Speaking
- 3 - TEXT 414 Knitted Structures
- 9 - Elective

15

132 Total Semester Hours¹HIST 101, 102, 172, 173.²ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.³See advisor.⁴See General Education Requirements.

COLLEGE OF HEALTH, EDUCATION, AND HUMAN DEVELOPMENT

The College of Health, Education, and Human Development oversees the academic programs offered by the School of Nursing, the Department of Public Health Sciences, and the Department of Parks, Recreation, and Tourism Management. The college also oversees the departments in the field of education which include Counseling and Educational Leadership, Curriculum and Instruction, Educational Foundations and Special Education, and Technology and Human Resource Development, as well as the Department of Family and Youth Development, the National Dropout Prevention Center, and the Joseph F. Sullivan Center for Nursing and Wellness.

The preparation of professional leaders in the areas of health, education, nursing, recreation, park management, and tourism services is the primary focus of the College of Health, Education, and Human Development. The educational resources of Clemson's other colleges are integrated into these curricular areas. This provides each student with the breadth as well as the depth to be a successful professional within the chosen field.

TEACHER EDUCATION PROGRAMS

The Teacher Education Programs prepare teachers, provide professional services to education in South Carolina, and carry out basic and applied research in education. Curricula are organized to give students the opportunity to acquire a broad general education through liberal arts and science courses, develop depth of knowledge in the teaching area, gain an understanding of the historical, philosophical, and psychological backgrounds of American education, and acquire knowledge of and skill and experience in using effective teaching techniques.

The Teacher Education Programs are nationally accredited for the preparation of educational personnel in South Carolina in Early Childhood Education (K-4), Elementary Education (grades 1-8), Special Education (K-12), and the following secondary school programs (grades 9-12): agriculture, technology education, biological sciences, physical sciences, earth science, mathematics, English, modern languages, history and geography, political science and economics, and psychology and sociology.

Admission

Professional. Application to the professional level of a program will be processed during the term in which a student is to complete 60 semester hours of work. At that time, the student will be notified of his/her status by the Teacher Education Office of Records and Certification. Admissible students must have passed all areas of the state-approved

basic skills examination and achieved a minimum cumulative grade point ratio of 2.5.

Directed Teaching. A student shall apply to the field experience director prior to May 1 of the academic year preceding the school year in which directed teaching is to be scheduled. The following conditions must be met prior to registration for directed teaching: (1) admission to the professional level of a program; (2) completion of at least 95 semester hours; (3) a minimum cumulative grade-point ratio of 2.5.

Enrollment in Professional Courses

Students enrolled in an approved teacher education program or listed with a major code of 300, 301, or 315 must have a cumulative grade-point ratio of 2.0 or higher for registration in required education, technology and human resource development, or agricultural education courses numbered at the 300 level. Enrollment in 400-level professional education courses is contingent upon admission to the professional level as described above. Any student who desires to enroll in education courses must meet the cumulative grade-point requirements established for education majors. A student who is denied admission may appeal to the Education Admissions Committee.

Graduation

To graduate, a student must have a score report on file in the Student Records Office for all state-mandated certification exams.

Graduate Study

Programs leading to the Master of Education, Master of Human Resource Development, Master of Industrial Education, Specialist in Education, Doctor of Education, and Doctor of Philosophy degrees are offered.

AGRICULTURAL EDUCATION

Bachelor of Science

The College of Health, Education, and Human Development and the College of Agriculture, Forestry, and Life Sciences conduct a cooperative program to produce agricultural teachers (grades 9-12) for South Carolina. (See the Agricultural Education curriculum under the College of Agriculture, Forestry, and Life Sciences.)

EARLY CHILDHOOD EDUCATION

Bachelor of Arts

The Early Childhood Education curriculum prepares students for teaching positions on the kindergarten and primary levels (grades K-4).

Freshman Year

First Semester

- 1 - ED 100 Orientation
- 3 - ENGL 101 Composition I
- 3 - MTHSC 115 Contemporary Mathematics for Elementary School Teachers I
- 4 - PH SC 108 Introduction to Physical Science
- 4 - Foreign Language Requirement¹

15

Second Semester

- 3 - ENGL 102 Composition II
- 3 - HIST 172 Western Civilization
- 3 - MTHSC 116 Contemporary Mathematics for Elementary School Teachers II
- 4 - PH SC 107 Introduction to Earth Science
- 4 - Foreign Language Requirement¹

17

Sophomore Year

First Semester

- 4 - BIOL 109 Introduction to Life Science
- 3 - HIST 173 Western Civilization
- 3 - Arts and Humanities Requirement²
- 3 - Foreign Language Requirement¹
- 3 - Literature Requirement¹
- 3 - Elective

19

Second Semester

- 3 - CP SC 120 Issues in Computers *or*
- 3 - ED F 480 Educational Applications of Microcomputers
- 3 - ED F 301 Principles of American Education
- 3 - ED F 334 Child Growth and Development
- 3 - Arts and Humanities Requirement²
- 3 - Foreign Language Requirement¹
- 3 - Elective

18

Junior Year

First Semester

- 3 - ED F 302 Educational Psychology
- 3 - ED SP 402 The Exceptional Child
- 3 - ENGL 385 Children's Literature
- 3 - SPCH 150 Intro. to Speech Communication *or*
- 3 - SPCH 250 Public Speaking
- 3 - THRD 310 Arts and Creativity for the Elementary Child
- 3 - Education Requirement⁴

18

Second Semester

- 3 - ED 466 Intro. to Early Childhood Education
- 1 - ED F (THRD) 315 Integrating Computers into the Classroom
- 3 - ED F 336 Behavior of the Preschool Child³
- 3 - ED F 458 Health Education
- 3 - GEOG 101 Introduction to Geography *or*
- 3 - GEOG 103 World Regional Geography
- 4 - Elective

17

Senior Year

(Courses must be taken as listed in both semesters.)

First Semester

- 3 - ED 321 Physical Education for Elementary School: Games and Sports Skills
- 3 - ED 400 Early Childhood Field Experience
- 3 - ED 459 Teach. Read. in the Early Grades: K-3
- 3 - ED 483 Methods and Materials for Early Childhood Education
- 3 - ED 488 Teaching the Language Arts in the Elementary School

15

Second Semester

- 12 - ED 484 Directed Teaching in Early Childhood Education

12

131 Total Semester Hours

*Two years of the same foreign language are required.

*HUM 301 and 302; or select three credits from two of the following fields:

Art—A A H 210

Music—MUSIC 210 or 311 or 400

Theatre—THEA 210 or 372

*ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.

*To be selected from ED 451, 452, 487, or 460.

*To be taken prior to or in the same semester as ED 466.

ELEMENTARY EDUCATION**Bachelor of Arts**

The Elementary Education curriculum prepares students for teaching on the elementary school level (grades 1-8).

Freshman Year**First Semester**

- 1 - ED 100 Orientation
3 - ENGL 101 Composition I
3 - MTHSC 115 Contemporary Mathematics for Elementary School Teachers I
4 - PH SC 108 Introduction to Physical Science
4 - Foreign Language Requirement¹

15

Second Semester

- 3 - ENGL 102 Composition II
3 - HIST 172 Western Civilization
3 - MTHSC 116 Contemporary Mathematics for Elementary School Teachers II
4 - PH SC 107 Introduction to Earth Science
4 - Foreign Language Requirement¹

17

Sophomore Year**First Semester**

- 4 - BIOL 109 Introduction to Life Science
3 - HIST 173 Western Civilization
3 - MTHSC 216 Geom. for Elem. School Teachers
3 - Arts and Humanities Requirement²
3 - Foreign Language Requirement¹
3 - Literature Requirement³

19

Second Semester

- 3 - CP SC 120 Issues in Computers or
3 - ED F 480 Educational Applications of Microcomputers
3 - ED F 334 Child Growth and Development
3 - GEOG 101 Introduction to Geography or
3 - GEOG 103 World Regional Geography
3 - SPCH 150 Intro. to Speech Communication or
3 - SPCH 250 Public Speaking
3 - Arts and Humanities Requirement²
3 - Foreign Language Requirement¹

18

Junior Year**First Semester**

- 3 - ED 321 Physical Education for Elementary School: Games and Sports Skills
3 - ED F 301 Principles of American Education
3 - ED F 302 Educational Psychology
3 - ED F 458 Health Education
3 - ENGL 385 Children's Literature
4 - Elective

19

Second Semester

- 3 - ED 452 Elem. Methods in Math. Teaching
3 - ED 459 Teach. Read. in the Early Grades: K-3
1 - ED F (THRD) 315 Integrating Computers into the Classroom
3 - ED SP 402 The Exceptional Child
3 - THRD 310 Arts and Creativity for the Elementary Child

6 - Elective

19

Senior Year

(Courses must be taken as listed in both semesters.)

First Semester

- 3 - ED 401 Elementary Field Experience
3 - ED 451 Elem. Methods in Science Teaching
3 - ED 460 Teach. Read. in the Inter. Grades 4-8
3 - ED 487 Teach. Soc. Studies in the Elem. Sch.
3 - ED 488 Teaching the Language Arts in the Elementary School

15

Second Semester

- 12 - ED 481 Directed Teaching in the Elementary School

12

134 Total Semester Hours

*Two years of the same foreign language are required.

*HUM 301 and 302; or select three credits from two of the following fields:

Art—A A H 210

Music—MUSIC 210 or 311 or 400

Theatre—THEA 210 or 372

*ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.

INDUSTRIAL EDUCATION**Bachelor of Science**

The Bachelor of Science degree in Industrial Education prepares students for professional teaching positions, as well as occupations within the framework of human resource development/industrial training in the private sector. To accomplish these purposes the curriculum is divided into the four areas of specialization. By the end of the freshman year, each student is required to select one of the four options: Customized Training and Development, Human Resource Development, Industrial Technology Education, or Vocational-Technical Education. Each option requires 135 semester hours of coursework.

CUSTOMIZED TRAINING AND DEVELOPMENT STUDY AREA

The Customized Training and Development study area is specifically designed to facilitate the transfer of credit from approved associate degree programs into the Bachelor of Science degree in Industrial Education. The curriculum builds upon the technical expertise gained in the associate programs to prepare individuals to become training specialists in business and industry. Students will exit the program with skills related to analyzing needs; conducting job and task analyses; designing, marketing, and evaluating training programs; delivering professional presentations; and developing instructional materials.

Freshman Year**First Semester**

- 3 - ENGL 101 Composition I
3 - Mathematical Sciences Requirement¹
4 - Science Requirement¹
3 - Technical Specialty Requirement²
3 - Elective

16

Second Semester

- 3 - ENGL 102 Composition II
3 - Mathematical Sciences Requirement¹
4 - Science Requirement¹
3 - Technical Specialty Requirement²
3 - Elective

16

Sophomore Year**First Semester**

- 3 - Humanities Requirement E.1¹
3 - Social Science Requirement¹
6 - Technical Specialty Requirement²
4 - Elective

16

Second Semester

- 3 - Computer Skills Requirement¹
3 - Humanities Requirement E.2¹
3 - Social Science Requirement¹
6 - Technical Specialty Requirement²

15

Summer

- 6 - THRD 390 Industrial Cooperative Experience I

Junior Year**First Semester**

- 3 - MGT 307 Personnel Management
3 - THRD 360 Ind. Organizations and Safety
3 - Major Requirement²
3 - Oral Communication Requirement¹
3 - Technical Specialty Requirement²

15

Second Semester

- 3 - PSYCH 364 Industrial Psychology or
3 - PRMT 308 Leadership and Group Processes in Recreation
3 - THRD 160 Training Programs in Industry
3 - Major Requirement²
3 - Technical Specialty Requirement²
3 - Writing Intensive Requirement¹

15

Summer

- 6 - THRD 490 Industrial Coop. Experience II

Senior Year**First Semester**

- 3 - THRD 460 Dev. Training Programs for Ind.
3 - THRD 468 Public Relations
6 - Major Requirement²
3 - Technical Specialty Requirement²

15

Second Semester

- 3 - MGT 400 Mgt. of Organizational Behavior or
3 - MGT 416 Mgt. of Human Resources or
3 - PSYCH 368 Organizational Psychology
3 - THRD 465 Conducting and Evaluating
Training Programs for Industry
3 - THRD 486 Instructional Media Development
3 - Major Requirement²
3 - Technical Specialty Requirement²

15

135 Total Semester Hours

¹See General Education Requirements.²To be approved by advisor.**HUMAN RESOURCE DEVELOPMENT OPTION**

The Human Resource Development option prepares students to enter industry or business as training and development specialists. The curriculum provides participants with a broad exposure to industrial processes in the areas of manufacturing, construction, power/transportation, and communications. Numerous hands-on experiences related to the application of technology in industry are integrated with valuable skills and knowledge from the training and development profession. Students will exit the program with skills related to analyzing needs; conducting job and task analyses; designing, marketing, and evaluating training programs; delivering professional presentations; and developing instructional materials.

Freshman Year**First Semester**

- 3 - ENGL 101 Composition I
3 - THRD 110 Intro. to Industrial Technology
3 - THRD 180 Introduction to Technical
Drawing and Computer Aided Drafting
3 - Mathematical Sciences Requirement¹
4 - Science Requirement¹

16

Second Semester

- 3 - ENGL 102 Composition II
3 - THRD 160 Training Programs in Industry
3 - THRD 181 Advanced Technical Drawing and
Computer-Aided Drafting
3 - Mathematical Sciences Requirement¹
4 - Science Requirement¹

16

Sophomore Year**First Semester**

- 3 - ACCT 200 Basic Accounting or
3 - ACCT 201 Accounting Concepts I
3 - CP SC 120 Issues in Computers
3 - THRD 220 Manufacturing Tech. I: Systems
3 - THRD 230 Construction Tech. I: Materials
3 - Literature Requirement²

15

Second Semester

- 3 - ECON 200 Economic Concepts or
3 - ECON 211 Principles of Microeconomics
3 - PSYCH 201 Introduction to Psychology
3 - SPCH 250 Public Speaking or
3 - SPCH 251 Business and Prof. Speaking
3 - THRD 240 Power Technology I: Production
3 - THRD 280 Comm. Tech. I: Processes and Mat.
1 - Elective

16

Junior Year**First Semester**

- 3 - ECON 301 Economics of Labor or
3 - ECON 308 Collective Bargaining
3 - MGT 301 Principles of Management
3 - THRD 484 Comm. Tech. II: Systems
3 - Humanities Requirement E.2³
3 - Major Requirement⁴
3 - Elective

18

Second Semester

- 3 - ENGL 314 Technical Writing
3 - MGT 307 Personnel Management
3 - THRD 360 Ind. Organizations and Safety
3 - THRD 430 Const. Tech. II: Practices and Syst.
3 - Major Requirement⁴
3 - Elective

18

Senior Year**First Semester**

- 3 - THRD 440 Power Technology II:
Transmission and Control Systems
3 - THRD 460 Dev. Training Programs for Ind.
3 - THRD 468 Public Relations
3 - Communication Requirement⁵
3 - Major Requirement⁴
3 - Elective

18

Second Semester

- 3 - MGT 416 Mgt. of Human Resources or
3 - MGT 400 Mgt. of Organizational Behavior or
3 - PSYCH 368 Organizational Psychology
3 - PSYCH 364 Industrial Psychology or
3 - PSYCH 454 Psychology of Human
Relationships or
3 - PRMT 308 Leadership and Group
Processes in Recreation
3 - THRD 420 Manuf. Tech. II: Mat. and Proc.
3 - THRD 465 Conducting and Evaluating
Training Programs for Industry
3 - THRD 486 Instructional Media Development
3 - Major Requirement⁴

18

135 Total Semester Hours

See General Education Requirements.

¹ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.²Select from PHIL 324, 344, SPCH 365³Must be approved by advisor; two technical courses must be represented.⁴Select from ENGL 304, SPCH 340, 350, 360, 361, 364.⁵Note: One summer (400 clock hours) of field experience is required of each student following the sophomore year.**INDUSTRIAL TECHNOLOGY EDUCATION OPTION**

The Industrial Technology Education option is for students who plan to teach industrial technology in the secondary schools (grades 6-12). Industrial technology is the subject area in the public school system which attempts to provide youth with an interpretation of American industry. It is a general education subject designed to give students exploratory experience in the classroom and laboratory. Majors in this option are qualified to seek certification as secondary school teachers of industrial technology, prevocational, and industrial arts education.

Freshman Year**First Semester**

- 1 - ED 100 Orientation
3 - ENGL 101 Composition I
3 - THRD 110 Intro. to Industrial Technology
3 - Mathematical Sciences Requirement¹
4 - Science Requirement²
2 - Elective

16

Second Semester

- 3 - ENGL 102 Composition II
3 - THRD 180 Introduction to Technical
Drawing and Computer-Aided Drafting
3 - Computer Skills Requirement¹
3 - Mathematical Sciences Requirement¹
4 - Science Requirement²
2 - Elective

18

Sophomore Year**First Semester**

- 3 - HIST 173 Western Civilization
3 - THRD 220 Manuf. Tech. I: Systems
3 - THRD 230 Construction Tech. I: Materials
3 - Literature Requirement¹
4 - Science Requirement²
1 - Elective

17

Second Semester

- 3 - MUSIC 210 Music Appreciation: Music in
the Western World
3 - SPCH 250 Public Speaking
3 - THRD 181 Advanced Technical Drawing and
Computer-Aided Drafting
3 - THRD 240 Power Technology I: Production
3 - THRD 280 Comm. Tech. I: Processes and Mat.
3 - Social Science Requirement¹

18

Junior Year**First Semester**

- 3 - ED F 302 Educational Psychology
- 3 - ED F 458 Health Education
- 3 - THRD 440 Power Technology II
- 3 - THRD 484 Comm. Tech. II: Systems
- 3 - Writing Intensive Requirement¹
- 2 - Elective

17**Second Semester**

- 3 - A A H 210 Intro. to Art and Architecture
- 3 - ED F 335 Adolescent Growth and Dev.
- 3 - THRD 415 History and Philosophy of Industrial and Vocational Education or
 - 3 - ED F 301 Prin. of American Education
- 3 - THRD 420 Manuf. Tech. II: Mat. and Proc.
- 3 - THRD 430 Const. Tech. II: Practices and Syst.
- 3 - Major Requirement⁴

18**Senior Year****First Semester**

- 3 - ED SP 402 The Exceptional Child
- 3 - THRD 470 Course Organization and Eval.
- 3 - THRD 471 Teaching Industrial Subjects
- 3 - Major Requirement⁴
- 4 - Elective

16**Second Semester**

- 3 - THRD 371 Mgt. of Industrial Education Labs.
- 12 - THRD 477 Directed Teaching

15

135 Total Semester Hours

¹See General Education Requirements.²Both biological and physical laboratory sciences must be represented with an eight-credit sequence in one.³ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.⁴To be selected from G C 207, 215, TEXT 333, 460, THRD 222, 224, 250, 281, 320, 441, 450, 480, 482, 483.**VOCATIONAL-TECHNICAL EDUCATION OPTION**

The Vocational-Technical Education option prepares teachers of vocational and technical subjects in senior high schools, career centers, and technical education centers. Teachers graduating from this option possess the skills and knowledge required to teach the occupation or family of occupations in their area of specialization.

Freshman Year**First Semester**

- 3 - ENGL 101 Composition I
- 3 - Mathematical Sciences Requirement¹
- 4 - Science Requirement¹
- 3 - Technical Specialty Requirement²
- 3 - Elective

16**Second Semester**

- 3 - ENGL 102 Composition II
- 3 - Mathematical Sciences Requirement¹
- 4 - Science Requirement¹
- 3 - Technical Specialty Requirement²
- 3 - Elective

16**Sophomore Year****First Semester**

- 3 - Humanities Requirement E.1¹
- 3 - Social Science Requirement¹
- 6 - Technical Specialty Requirement²
- 4 - Elective

16**Second Semester**

- 3 - Computer Skills Requirement¹
- 3 - Humanities Requirement E.2¹
- 3 - Social Science Requirement¹
- 6 - Technical Specialty Requirement²

15**Summer**

- 6 - THRD 390 Industrial Cooperative Experience I

Junior Year**First Semester**

- 3 - SPCH 250 Public Speaking
- 3 - THRD 370 Motivation and Discipline in Vocational Education
- 3 - Approved Requirement³
- 6 - Technical Specialty Requirement²

15**Second Semester**

- 3 - THRD 371 Mgt. of Industrial Education Labs.
- 3 - Approved Requirement³
- 6 - Technical Specialty Requirement²
- 3 - Writing Intensive Requirement¹

15**Summer**

- 6 - THRD 490 Industrial Coop. Experience II

Senior Year**First Semester**

- 3 - THRD 470 Course Organization and Eval.
- 3 - THRD 471 Teaching Industrial Subjects
- 3 - THRD 472 Advanced Instructional Methods
- 6 - THRD 478 Internship in Voc. Tech. Ed. I

15**Second Semester**

- 3 - THRD 415 History and Philosophy of Industrial and Vocational Education or
 - 3 - ED F 301 Prin. of American Education
- 3 - THRD 473 Competency Test. in Voc. Subjects
- 6 - THRD 479 Internship in Voc. Technical Ed. II
- 3 - THRD (AG ED, ED F) 480 Educational Applications of Microcomputers

15

135 Total Semester Hours

¹See General Education Requirements.²See advisor. Technical specialties must relate to one of the Trades and Industries programs recognized by the South Carolina Department of Education.³Must be approved by advisor.**MATHEMATICS TEACHING****Bachelor of Science**

The program leading to a Bachelor of Science degree in Mathematics Teaching is designed for students planning to teach mathematics on the secondary school level (grades 9–12).

Freshman Year**First Semester**

- 4 - BIOL 103 General Biology I
- 4 - CH 105 Beg. General and Organic Chemistry I
- 1 - ED 100 Orientation
- 3 - ENGL 101 Composition I
- 4 - MTHSC 106 Calculus of One Variable I
- 2 - Elective

18**Second Semester**

- 4 - BIOL 104 General Biology II
- 4 - CH 106 Beg. Gen. and Organic Chemistry
- 3 - ENGL 102 Composition II
- 4 - MTHSC 108 Calculus of One Variable II
- 3 - Elective

18**Sophomore Year****First Semester**

- 3 - CP SC 120 Issues in Computers
- 3 - HIST 172 Western Civilization
- 4 - MTHSC 206 Calculus of Several Variables
- 4 - PHYS 207 General Physics I
- 3 - Literature Requirement¹

17**Second Semester**

- 3 - CP SC 111 Elem. Computer Prog. in C/C++ or
 - 3 - MTHSC 360 Inter. Math. Computing
- 3 - ED F 302 Educational Psychology
- 3 - HIST 173 Western Civilization
- 3 - HUM 301 or 302 Humanities²
- 4 - PHYS 208 General Physics II
- 2 - Elective

18**Junior Year****First Semester**

- 3 - ED F 301 Principles of American Education
- 3 - MTHSC 301 Statistical Theory and Methods I
- 3 - MTHSC 308 College Geometry
- 3 - Mathematics Requirement³
- 3 - Social Science Requirement⁴
- 3 - Elective

18**Second Semester**

- 3 - ED 426 Teaching Secondary Mathematics⁵
- 3 - ED 498 Secondary Content Area Reading⁵
- 1 - ED F (THRD) 315 Integrating Computers into the Classroom
- 3 - MTHSC 311 Linear Algebra
- 3 - MTHSC 408 Topics in Geometry
- 3 - Social Science Requirement⁴

16

Senior Year*(Directed Teaching—Either Semester)***First Semester**

- 3 - ED F 335 Adolescent Growth and Dev.
- 3 - ENGL 314 Technical Writing
- 3 - MTHSC 412 Introduction to Modern Algebra
- 3 - MTHSC 453 Advanced Calculus I
- 3 - SPCH 150 Intro. to Speech Comm. or
- 3 - SPCH 250 Public Speaking
- 3 - Mathematics Requirement¹

18

Second Semester

- 12 - ED 412 Directed Teaching
- 3 - ED SP 402 The Exceptional Child

15

138 Total Semester Hours

¹ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.²This requirement may be satisfied by completing A H 210 and MUSIC 210 or 311. In this case, the additional three credits will be recorded as electives.³Any 200–400-level mathematics course, except MTHSC 207, 210, 215, 216.⁴Economics (including AP EC 202) geography, political science, psychology, sociology.⁵To be taken the semester prior to Directed Teaching.**SCIENCE TEACHING****Bachelor of Science**

The program leading to a Bachelor of Science degree in Science Teaching is designed for students planning to teach biological sciences, chemistry, earth sciences, or physical sciences on the secondary school level (grades 9–12). The required science electives are included to give some degree of competency in a field other than the major area. Students are urged to discuss the NTE with their advisor upon completion of the sophomore year.

**TEACHING AREA:
BIOLOGICAL SCIENCES****Freshman Year****First Semester**

- 4 - CH 101 General Chemistry
- 3 - CP SC 120 Issues in Computers
- 3 - ENGL 101 Composition I
- 3 - HIST 172 Western Civilization
- 4 - MTHSC 106 Calculus of One Variable I

17

Second Semester

- 4 - CH 102 General Chemistry
- 1 - ED 100 Orientation
- 3 - ENGL 102 Composition II
- 3 - HIST 173 Western Civilization
- 3 - MTHSC 301 Stat. Theory and Methods I or
- 4 - MTHSC 108 Calculus of One Variable II
- 3 - Elective

17-18

Sophomore Year**First Semester**

- 5 - BIOL 110 Principles of Biology I
- 4 - CH 201 Survey of Organic Chemistry or
- 3 - CH 330 Intro. to Physical Chemistry
- 3 - ED F 301 Principles of American Education
- 1 - ED F (THRD) 315 Integrating Computers into the Classroom
- 4 - PHYS 207 General Physics I

16-17

Second Semester

- 5 - BIOL 111 Principles of Biology II
- 3 - ED F 302 Educational Psychology
- 4 - PHYS 208 General Physics II
- 3 - SPCH 150 Intro. to Speech Communication or
- 3 - SPCH 250 Public Speaking
- 3 - Literature Requirement¹

18

Junior Year**First Semester**

- 3 - BIOCH 210 Elementary Biochemistry and
- 1 - BIOCH 211 Elementary Biochemistry Lab. or
- 3 - BIOCH 301 General Biochemistry and
- 1 - BIOCH 302 Molecular Biology Lab.
- 4 - BIOSC 222 Human Anatomy and Phys. I
- 3 - ED F 335 Adolescent Growth and Dev.
- 4 - GEN 302 Genetics
- 4 - Elective

19

Second Semester

- 4 - BIOSC 223 Human Anatomy and Phys. II
- 3 - ENGL 314 Technical Writing
- 3 - HUM 301 or 302 Humanities
- 4 - Plant Diversity Requirement²
- 3 - Social Science Requirement³

17

Senior Year*(Directed Teaching—Either Semester)***First Semester**

- 3 - ED 427 Teaching Secondary Science⁴
- 3 - ED 498 Secondary Content Area Reading⁴
- 4 - Animal Diversity Requirement⁵
- 3-4 - Biology Requirement⁶
- 3 - Social Science Requirement¹
- 3 - Elective

19-20

Second Semester

- 12 - ED 412 Directed Teaching
- 3 - ED SP 402 The Exceptional Child

15

138-141 Total Semester Hours

¹ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.²BIOSC 304/308 or 305/309.³Select from anthropology, economics, geography, political science, psychology, sociology.⁴To be taken semester immediately prior to student teaching.⁵Select from BIOSC 302/306 or 303/307.⁶Select from BIOSC 320, 335, 336, 420, 470, or 491.

Note: This curriculum leads to South Carolina certification to teach all science subjects in grades 7–12 and provides special expertise for teaching middle school life science and senior high school biological sciences.

**TEACHING AREA:
EARTH SCIENCES****Freshman Year****First Semester**

- 4 - CH 101 General Chemistry
- 3 - CP SC 120 Issues in Computers
- 3 - ENGL 101 Composition I
- 1 - GEOL 100 Current Topics in Geology
- 3 - HIST 172 Western Civilization
- 4 - MTHSC 106 Calculus of One Variable I

18

Second Semester

- 4 - CH 102 General Chemistry
- 1 - ED 100 Orientation
- 3 - ENGL 102 Composition II
- 3 - GEOL 101 Physical Geology
- 1 - GEOL 103 Physical Geology Lab.
- 3 - HIST 173 Western Civilization
- 3 - MTHSC 301 Stat. Theory and Methods I

18

Sophomore Year**First Semester**

- 4 - BIOL 103 General Biology I
- 3 - ED F 301 Principles of American Education
- 4 - GEOL 102 Historical Geology
- 4 - PHYS 207 General Physics I
- 3 - Literature Requirement¹

18

Second Semester

- 4 - BIOL 104 General Biology II
- 3 - ED F 302 Educational Psychology
- 4 - GEOL 302 Structural Geology
- 4 - PHYS 208 General Physics II
- 3 - SPCH 150 Intro. to Speech Communication or
- 3 - SPCH 250 Public Speaking

18

Junior Year**First Semester**

- 3 - ASTR 101 Solar System Astronomy
- 1 - ASTR 103 Solar System Astronomy Lab.
- 3 - ED F 335 Adolescent Growth and Dev.
- 4 - GEOL 306 Mineralogy
- 3 - Social Science Requirement²
- 4 - Elective

18

Second Semester

- 3 - ASTR 102 Stellar Astronomy
- 1 - ASTR 104 Stellar Astronomy Lab.
- 1 - ED F (THRD) 315 Integrating Computers into the Classroom
- 3 - ENGL 314 Technical Writing
- 3 - PHYS 240 Physics of the Weather
- 3 - Geology Requirement³
- 3 - Elective

17

Senior Year*(Directed Teaching—Either Semester)***First Semester**

- 3 - ED 427 Teaching Secondary Science⁴
- 3 - ED 498 Secondary Content Area Reading⁴
- 3 - HUM 301 or 302 Humanities
- 3 - Geology Requirement¹
- 3 - Social Science Requirement²
- 3 - Elective

18

Second Semester

- 12 - ED 412 Directed Teaching
- 3 - ED SP 402 The Exceptional Child

15

140 Total Semester Hours

¹ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.²Anthropology, economics (including AP EC 202), geography, political science, psychology, sociology.³Select from GEOL 210, (ASTR) 220, 300, 314, 316, or 405. (Each course may be taken only once.)⁴To be taken semester immediately prior to student teaching.

Note: This curriculum leads to South Carolina certification to teach all science subjects in grades 7–12 and provides special expertise for teaching middle and secondary earth and environmental sciences.

TEACHING AREA: PHYSICAL SCIENCES**Freshman Year****First Semester**

- 4 - CH 101 General Chemistry
- 3 - CP SC 120 Issues in Computers
- 3 - ENGL 101 Composition I
- 3 - HIST 172 Western Civilization
- 4 - MTHSC 106 Calculus of One Variable I

17

Second Semester

- 4 - CH 102 General Chemistry
- 2 - CH 205 Introduction to Inorganic Chemistry
- 1 - ED 100 Orientation
- 3 - ENGL 102 Composition II
- 3 - HIST 173 Western Civilization
- 4 - MTHSC 108 Calculus of One Variable II

17

Sophomore Year**First Semester**

- 4 - BIOL 103 General Biology I
- 4 - CH 201 Survey of Organic Chemistry
- 3 - ED F 301 Principles of American Education
- 3 - MTHSC 301 Statistical Theory and Methods I
- 1 - PHYS 101 Current Topics in Modern Physics
- 3 - SPCH 150 Intro. to Speech Communication or
- 3 - SPCH 250 Public Speaking

18

Second Semester

- 4 - BIOL 104 General Biology II
- 3 - CH 330 Intro. to Physical Chemistry
- 3 - ED F 302 Educational Psychology
- 3 - ENGL 314 Technical Writing
- 3 - PHYS 122 Physics with Calculus I
- 1 - PHYS 124 Physics Lab. I

17

Junior Year**First Semester**

- 3 - ED F 335 Adolescent Growth and Dev.
- 3 - HUM 301 or 302 Humanities
- 3 - PHYS 221 Physics with Calculus II
- 1 - PHYS 223 Physics Lab. II
- 3-4 - Astronomy Requirement¹
- 4 - Elective

17-18

Second Semester

- 1 - ED F (THRD) 315 Integrating Computers into the Classroom
- 3 - PHYS 222 Physics with Calculus III
- 1 - PHYS 224 Physics Lab. III
- 3 - PHYS 240 Physics of the Weather
- 3 - Literature Requirement²
- 3 - Social Science Requirement³
- 3 - Elective

17

Senior Year*(Directed Teaching—Either Semester)***First Semester**

- 3 - CH 313 Quantitative Analysis
- 1 - CH 317 Quantitative Analysis Lab.
- 3 - ED 427 Teaching Secondary Science⁴
- 3 - ED 498 Secondary Content Area Reading⁴
- 2-4 - Physics Requirement¹
- 3 - Social Science Requirement¹
- 3 - Elective

18-20

Second Semester

- 12 - ED 412 Directed Teaching
- 3 - ED SP 402 The Exceptional Child

15

136-139 Total Semester Hours

¹ASTR 101/103 or ASTR (GEOL) 220.²ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.³Select from anthropology, economics, geography, political science, psychology, sociology.⁴To be taken semester immediately prior to student teaching.⁵Select from ASTR 302, 303, PHYS 290, 311, or 452.

Note: This curriculum leads to South Carolina certification to teach all science subjects in grades 7–12 and provides special expertise for teaching secondary school chemistry, physics, and physical sciences.

SECONDARY EDUCATION**Bachelor of Arts**

Programs leading to a Bachelor of Arts degree in Secondary Education are available to students preparing to teach English, history/geography, mathematics, modern languages (French, German, Spanish), political science/economics, and psychology/sociology on the secondary school level (grades 9–12). The teaching field should be selected as early as possible in order that appropriate freshman and sophomore courses may be taken.

Each curriculum requires a major concentration in the teaching field. Specific courses and sequences have been designated by teacher education committees to meet requirements for those planning to teach. Students who have elective courses in the teaching area should consult the departmental advisor prior to scheduling these courses.

The professional education courses should be completed in sequence prior to registering for the block schedule. Application to Directed Teaching (ED 412) should be made in writing no later than May 1 preceding the school year in which student teaching is to be scheduled. A student whose cumulative grade-point ratio is lower than the requirement for graduation will not be permitted to register for Directed Teaching.

Education 412 is conducted on a full-day basis, "block schedule," for one semester.

TEACHING AREA: ENGLISH**Freshman Year****First Semester**

- 3 - ENGL 101 Composition I
- 3 - MTHSC 101 Introduction to Probability
- 3 - Computer Skills Requirement¹
- 4 - Foreign Language Requirement²
- 4 - Science Requirement¹

17

Second Semester

- 1 - ED 100 Orientation
- 3 - ENGL 102 Composition II
- 3 - HIST 172 Western Civilization
- 3 - MTHSC 102 Intro. to Mathematical Analysis
- 4 - Foreign Language Requirement²
- 4 - Science Requirement¹

18

Sophomore Year**First Semester**

- 3 - ED F 301 Principles of American Education
- 3 - ENGL 202 Major Forms of Literature
- 3 - HIST 173 Western Civilization
- 3 - SPCH 150 Intro. to Speech Communication or
- 3 - SPCH 250 Public Speaking
- 3 - Foreign Language Requirement²
- 3 - Social Science Requirement¹

18

Second Semester

- 3 - ED F 302 Educational Psychology
- 3 - ENGL 209 Contemporary Literature
- 3 - ENGL 353 Ethnic American Literature
- 3 - Foreign Language Requirement²
- 3 - Social Science Requirement¹
- 3 - Elective

18

Junior Year**First Semester**

- 1 - ED F (THRD) 315 Integrating Computers into the Classroom
- 3 - ED F 335 Adolescent Growth and Dev.
- 3 - HIST 365 English Cultural History
- 3 - HUM 301 or 302 Humanities⁴
- 6 - Teaching Major⁵

16

Second Semester

- 3 - ED 424 Teaching Secondary English⁶
- 3 - ED 498 Secondary Content Area Reading⁶
- 9 - Teaching Major⁵
- 3 - Elective

18

Senior Year*(Directed Teaching—Either Semester)***First Semester**

- 3 - ED SP 402 The Exceptional Child
- 9 - Teaching Major¹
- 4 - Elective

16

Second Semester

- 12 - ED 412 Directed Teaching

12

133 Total Semester Hours¹See General Education Requirements.²Two years of the same language are required.³Anthropology, economics, (including AP EC 202), geography, political science, psychology, or sociology.⁴This requirement may be satisfied by completing A H 210 and MUSIC 210 or 311. In this case, the additional three credit hours will be recorded as electives.⁵In addition to ENGL 209 and 353, the Teaching Major requires 24 credits of junior and senior English courses and must include ENGL 386; 400; 401; 405 or 406; 411; 422; 423, 424 or 425; 435; 485.⁶To be taken in the semester preceding Directed Teaching.**TEACHING AREA:****HISTORY AND GEOGRAPHY****Freshman Year****First Semester**

- 1 - ED 100 Orientation
- 3 - ENGL 101 Composition I
- 3 - MTHSC 101 Introduction to Probability
- 4 - Foreign Language Requirement¹
- 4 - Science Requirement²
- 2 - Elective

17

Second Semester

- 3 - ENGL 102 Composition II
- 3 - HIST 172 Western Civilization
- 3 - MTHSC 102 Intro. to Mathematical Analysis
- 4 - Foreign Language Requirement¹
- 4 - Science Requirement²

17

Sophomore Year**First Semester**

- 3 - CP SC 120 Issues in Computers or
- 3 - ED F 480 Educational Applications of Microcomputers
- 3 - GEOG 101 Introduction to Geography or
- 3 - GEOG 103 World Regional Geography
- 3 - HIST 173 Western Civilization
- 3 - SOC 201 Introduction to Sociology
- 3 - Foreign Language Requirement¹
- 3 - Literature Requirement¹

18

Second Semester

- 3 - ED F 301 Principles of American Education
- 3 - HIST 101 History of the United States
- 3 - Foreign Language Requirement¹
- 3 - Writing Intensive Requirement²
- 6 - Elective

18

Junior Year**First Semester**

- 3 - ED F 302 Educational Psychology
- 3 - ED F 335 Adolescent Growth and Dev.
- 3 - HIST 102 History of the United States
- 9 - Teaching Major⁴

18

Second Semester

- 3 - ED 428 Teaching Secondary Social Studies¹
- 3 - ED 498 Secondary Content Area Reading¹
- 1 - ED F (THRD) 315 Integrating Computers into the Classroom
- 3 - SPCH 150 Intro. to Speech Communication or
- 3 - SPCH 250 Public Speaking
- 6 - Teaching Major⁴
- 2 - Elective

18

Senior Year*(Directed Teaching—Either Semester)***First Semester**

- 3 - ECON 200 Economic Concepts
- 3 - HUM 301 or 302 Humanities⁶
- 3 - PO SC 101 Intro. to American Politics
- 9 - Teaching Major⁵

18

Second Semester

- 12 - ED 412 Directed Teaching
- 3 - ED SP 402 The Exceptional Child

15

139 Total Semester Hours¹Two years of the same language are required.²See advisor. Select from General Education courses.³ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.⁴Consists of 24 semester hours of junior and senior (300 and 400) level courses composed of 18 semester hours from history and six semester hours from geography. Courses must be selected with the consent of the advisor and include at least three hours in each of the following categories: United States history or geography, European history or geography, Third World or non-European history or geography. At least six hours must be at the 400 level. HIST 313 is recommended for those planning to teach in South Carolina.⁵To be taken in the semester preceding Directed Teaching.⁶This requirement may be satisfied by completing A H 210 and MUSIC 210 or 311. In this case, the additional three credit hours will be recorded as electives.**TEACHING AREA:****MATHEMATICS****Freshman Year****First Semester**

- 4 - BIOL 103 General Biology I
- 1 - ED 100 Orientation
- 3 - ENGL 101 Composition I
- 4 - MTHSC 106 Calculus of One Variable I
- 4 - Foreign Language Requirement¹

16

Second Semester

- 4 - BIOL 104 General Biology II
- 3 - ENGL 102 Composition II
- 4 - MTHSC 108 Calculus of One Variable II
- 4 - Foreign Language Requirement¹
- 3 - Elective

18

Sophomore Year**First Semester**

- 3 - CP SC 120 Issues in Computers
- 4 - MTHSC 206 Calculus of Several Variables
- 3 - Foreign Language Requirement¹
- 3 - Literature Requirement²
- 3 - Science Requirement¹
- 2 - Elective

18

Second Semester

- 3 - CP SC 111 Elem. Computer Prog. in C/C++ or
- 3 - MTHSC 360 Inter. Math. Computing
- 3 - ED F 302 Educational Psychology
- 3 - HIST 172 Western Civilization
- 3 - Foreign Language Requirement¹
- 3 - Science Requirement¹
- 3 - Social Science Requirement⁴

18

Junior Year**First Semester**

- 3 - ED F 301 Principles of American Education
- 1 - ED F (THRD) 315 Integrating Computers into the Classroom
- 3 - HIST 173 Western Civilization
- 3 - MTHSC 301 Statistical Theory and Methods I
- 3 - MTHSC 308 College Geometry
- 3 - Social Science Requirement⁴
- 2 - Elective

18

Second Semester

- 3 - ED 426 Teaching Secondary Mathematics⁵
- 3 - ED 498 Secondary Content Area Reading⁵
- 3 - HUM 301 or 302 Humanities⁶
- 3 - MTHSC 311 Linear Algebra
- 3 - MTHSC 408 Topics in Geometry
- 3 - Elective

18

Senior Year*(Directed Teaching—Either Semester)***First Semester**

- 3 - ED F 335 Adolescent Growth and Dev.
- 3 - ENGL 314 Technical Writing
- 3 - MTHSC 412 Introduction to Modern Algebra
- 3 - MTHSC 453 Advanced Calculus I
- 3 - SPCH 250 Public Speaking
- 3 - Mathematics Requirement⁷

18

Second Semester

- 12 - ED 412 Directed Teaching
- 3 - ED SP 402 The Exceptional Child

15

139 Total Semester Hours¹Two years of the same language are required.²ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.³Astronomy, chemistry, geology, physics.⁴Economics (including AP EC 202), geography, political science, psychology, sociology.⁵To be taken in the semester preceding Directed Teaching.⁶This requirement may be satisfied by completing A H 210 and MUSIC 210 or 311. In this case, the additional three credit hours will be recorded as electives.⁷Any 200-400 level mathematics course, except MTHSC 207, 210, 215, 216.

TEACHING AREA: MODERN LANGUAGES

(French, German, and Spanish)

Freshman Year

First Semester

- 1 - ED 100 Orientation
- 3 - ENGL 101 Composition I
- 3 - MTHSC 101 Introduction to Probability
- 4 - Foreign Language Requirement¹
- 4 - Science Requirement²

15

Second Semester

- 3 - ENGL 102 Composition II
- 3 - HIST 172 Western Civilization
- 3 - MTHSC 102 Intro. to Mathematical Analysis
- 4 - Foreign Language Requirement¹
- 4 - Science Requirement²

17

Sophomore Year

First Semester

- 3 - ED F 301 Principles of American Education
- 3 - HIST 173 Western Civilization
- 3 - Computer Skills Requirement²
- 3 - Foreign Language Requirement¹
- 3 - Literature Requirement³

15

Second Semester

- 3 - ED F 302 Educational Psychology
- 3 - Foreign Language Requirement¹
- 3 - Literature Requirement³
- 3 - Social Science Requirement⁴
- 6 - Elective

18

Junior Year

First Semester

- 3 - ED F 335 Adolescent Growth and Dev.
- 3 - Social Science Requirement⁴
- 9 - Teaching Major⁵
- 3 - Elective

18

Second Semester

- 1 - ED F (THRD) 315 Integrating Computers into the Classroom
- 3 - SPCH 150 Intro. to Speech Communication or
- 3 - SPCH 250 Public Speaking
- 9 - Teaching Major⁵
- 3 - Elective

16

Senior Year

(Directed Teaching—Either Semester)

First Semester

- 3 - ED 425 Teach. Secondary Modern Languages⁶
- 3 - ED 498 Secondary Content Area Reading⁶
- 3 - HUM 301 or 302 Humanities⁷
- 6 - Teaching Major⁵
- 3 - Writing Intensive Requirement²

18

Second Semester

- 12 - ED 412 Directed Teaching
- 3 - ED SP 402 The Exceptional Child

15

132 Total Semester Hours

¹Two years of the same language are required.²See General Education Requirements.³ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.⁴Economics (including APEC 202), political science, psychology, sociology, geography, anthropology.⁵Requires 24 credits in French, German, or Spanish as listed.⁶French—must include FR 409, and 21 credits arranged as follows:

Group I—FR 300, 305, 307, 309.

Group II—Nine credits at the 400 level, including at least one 400-level literature course.

⁷German—must include GER 305, 411, and 18 credits arranged as follows:

Group I—12 credits from GER 301, 302, 308, 316, 412 or 416.

Group II—Six credits from GER 401, 402, 403, 413.

⁸Spanish—must include 24 credits arranged as follows:

Group I—SPAN 303 or 404 and 311 (preferably in sequence).

Group II—SPAN 305, 307, 308.

Group III—SPAN 401 and 409.

Group IV—Three credits from 300–400 level courses.

⁹To be taken the semester prior to Directed Teaching.⁶May be satisfied by completing A A H 210 and MUSIC 210 or 311. In this case, the additional three credits will be recorded as electives.

TEACHING AREA: POLITICAL SCIENCE AND ECONOMICS

Freshman Year

First Semester

- 1 - ED 100 Orientation
- 3 - ENGL 101 Composition I
- 3 - HIST 172 Western Civilization
- 3 - MTHSC 101 Introduction to Probability
- 4 - Foreign Language Requirement¹
- 4 - Science Requirement²

18

Second Semester

- 3 - ENGL 102 Composition II
- 3 - HIST 173 Western Civilization
- 3 - MTHSC 102 Intro. to Mathematical Analysis
- 4 - Foreign Language Requirement¹
- 4 - Science Requirement²

17

Sophomore Year

First Semester

- 3 - HIST 101 History of the United States
- 3 - SOC 201 Introduction to Sociology
- 3 - Computer Skills Requirement²
- 3 - Foreign Language Requirement¹
- 3 - Literature Requirement³
- 2 - Elective

17

Second Semester

- 3 - ECON 200 Economic Concepts⁴
- 3 - ED F 301 Principles of American Education
- 3 - HIST 102 History of the United States
- 3 - PO SC 101 Introduction to American Politics
- 3 - Foreign Language Requirement¹
- 3 - Elective

18

Junior Year

First Semester

- 3 - ED F 302 Educational Psychology
- 1 - ED F (THRD) 315 Integrating Computers into the Classroom
- 3 - ED F 335 Adolescent Growth and Dev.
- 9 - Teaching Major⁵
- 2 - Elective

18

Second Semester

- 3 - ED 428 Teaching Secondary Social Studies⁶
- 3 - ED 498 Secondary Content Area Reading⁶
- 3 - SPCH 150 Intro. to Speech Communication or
- 3 - SPCH 250 Public Speaking
- 9 - Teaching Major⁵

18

Senior Year

(Directed Teaching—Either Semester)

First Semester

- 3 - GEOG 101 Introduction to Geography or
- 3 - GEOG 103 World Regional Geography
- 3 - HUM 301 or 302 Humanities⁷
- 6 - Teaching Major⁵
- 3 - Writing Intensive Requirement²
- 3 - Elective

18

Second Semester

- 12 - ED 412 Directed Teaching
- 3 - ED SP 402 The Exceptional Child

15

139 Total Semester Hours

¹Two years of the same language are required.²See General Education Requirements.³ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.⁴Students may take ECON 211/212 in lieu of ECON 200. In that case, the three extra hours are credited as electives.⁵Teaching Major consists of 24 semester hours of junior and senior (300 and 400) level courses selected from political science and economics (ECON 301, 302, 309, 310, 404 recommended) with no fewer than nine hours in each of these areas. Political science credits are to be drawn from at least three of the following fields:

American Governments—PO SC 403, 405, 432, 433, 442

Comparative Politics—PO SC 371, 373, 471, 475, 476, 477

International Relations—PO SC 361, 362, 363, 428, 465

Political Theory—PO SC 451, 452, 453

Public Policy and Administration—PO SC 302, 321, 422

⁶To be taken the semester preceding Directed Teaching.⁷May be satisfied by completing A A H 210 and MUSIC 210 or 311. In this case, the additional three credit hours will be recorded as electives.

TEACHING AREA: PSYCHOLOGY AND SOCIOLOGY

Freshman Year

First Semester

- 1 - ED 100 Orientation
- 3 - ENGL 101 Composition I
- 3 - MTHSC 101 Introduction to Probability
- 4 - Foreign Language Requirement¹
- 4 - Science Requirement²
- 2 - Elective

17

Second Semester

- 3 - ENGL 102 Composition II
- 3 - HIST 172 or 173 Western Civilization
- 3 - MTHSC 102 Intro. to Mathematical Analysis
- 4 - Foreign Language Requirement¹
- 4 - Science Requirement²

17

Sophomore Year

First Semester

- 3 - GEOG 101 Introduction to Geography or
- 3 - GEOG 103 World Regional Geography
- 3 - HIST 101 History of the United States
- 3 - MTHSC 201 Introduction to Psychology
- 3 - Computer Skills Requirement¹
- 3 - Foreign Language Requirement¹
- 3 - Literature Requirement¹

18

Second Semester

- 1 - ED F (THRD) 315 Integrating Computers into the Classroom
- 3 - HIST 102 History of the United States
- 3 - PO SC 101 Introduction to American Politics
- 3 - SOC 201 Introduction to Sociology
- 3 - SPCH 150 Intro. to Speech Communication or
- 3 - SPCH 250 Public Speaking
- 3 - Foreign Language Requirement¹
- 2 - Elective

18

Junior Year

First Semester

- 3 - ED F 301 Principles of American Education
- 3 - ED F 302 Educational Psychology
- 3 - ED F 335 Adolescent Growth and Dev.
- 9 - Teaching Major⁴

18

Second Semester

- 3 - ECON 200 Economic Concepts
- 3 - ED 428 Teaching Secondary Social Studies³
- 3 - ED 498 Secondary Content Area Reading⁵
- 3 - Non-Western History Requirement⁶
- 6 - Teaching Major⁴

18

Senior Year

(Directed Teaching—Either Semester)

First Semester

- 3 - HUM 301 or 302 Humanities²
- 6 - Teaching Major⁴
- 3 - Writing Intensive Requirement²
- 6 - Elective

18

Second Semester

- 12 - ED 412 Directed Teaching
- 3 - ED SP 402 The Exceptional Child

15

139 Total Semester Hours

¹Two years of the same language are required.

²See General Education Requirements.

³ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.

⁴Teaching Major consists of 21 semester hours of junior and senior (300 and 400) level courses selected from sociology/anthropology and psychology with no fewer than nine hours in each of these two areas. Recommended courses include ANTH 301, 320; PSYCH 320, 330, 333, 340, 352, 370, 415; SOC 311, 392, 397, 460, 461, 481.

⁵To be taken in the semester preceding Directed Teaching.

⁶HIST 330, 333, 338, 339, 340, 341, or 342.

⁷May be satisfied by completing A H 210 and MUSIC 210 or 311. In this case, the additional three credit hours will be recorded as electives.

SPECIAL EDUCATION

Bachelor of Arts

The Bachelor of Arts degree in Special Education prepares students for professional careers working with students with mild to moderate disabilities (grades K–12). The core curriculum assures graduates of having the skills and knowledge required for initial employment in the public schools of this state. By using the electives advisedly, students should be able to meet requirements of any state which provides a resource room model providing special services to any students with mild to moderate disabilities, provided the students share similar learning styles. Practical experiences begin with the freshman year and peak with the senior year. These experiences provide opportunities for students to apply their knowledge and skills. The practical experiences culminate in a two-semester senior year field-based training under the mentorship of both school and University supervisors.

Freshman Year

First Semester

- 1 - ED 100 Orientation
- 3 - ENGL 101 Composition I
- 3 - MTHSC 115 Contemporary Mathematics for Elementary School Teachers I
- 4 - Foreign Language Requirement¹
- 4 - Science Requirement²

15

Second Semester

- 3 - ENGL 102 Composition II
- 3 - HIST 172 Western Civilization
- 3 - MTHSC 116 Contemporary Mathematics for Elementary School Teachers II
- 4 - Foreign Language Requirement¹
- 4 - Science Requirement²

17

Sophomore Year

First Semester

- 1 - ED F (THRD) 315 Integrating Computers into the Classroom
- 3 - HIST 173 Western Civilization
- 3 - Foreign Language Requirement¹
- 3 - Literature Requirement¹

4 - Science Requirement²

3 - Elective

17

Second Semester

- 3 - GEOG 101 Introduction to Geography
- 3 - SPCH 150 Intro. to Speech Communication or
- 3 - SPCH 250 Public Speaking
- 3 - Computer Skills Requirement⁴
- 3 - Foreign Language Requirement¹
- 6 - Elective

18

Junior Year

First Semester

- 3 - ED 459 Teach. Read. in the Early Grades: K–3
- 3 - ED F 301 Principles of American Education
- 3 - ED F 302 Educational Psychology
- 3 - ED F 334 Child Growth and Development
- 3 - ED F 458 Health Education
- 3 - ED SP 402 The Exceptional Child

18

Second Semester

- 3 - ED 452 Elem. Methods in Math. Teaching
- 3 - ED 460 Teach. Read. in the Inter. Grades: 4–8
- 3 - ED 488 Teach. Lang. Arts in the Elem. School
- 3 - ED F 335 Adolescent Growth and Dev.
- 3 - ED SP 371 Char. of the Mildly Handicapped⁵
- 3 - Elective

18

Senior Year

(Directed Teaching Must Be Taken as Shown)

First Semester⁶

- 3 - ED SP 491 Assessment of Students with Mild Disabilities
- 3 - ED SP 492 Educational Interventions for Individuals with Mild Disabilities
- 3 - ED SP 493 Behavioral Skill Intervention for the Handicapped
- 3 - ED SP 494 Teaching Reading to Students with Mild Disabilities
- 3 - ED SP 496 Special Education Field Experience

15

Second Semester

- 12 - ED SP 413 Directed Teaching
- 3 - ED SP 495 Communication and Collaboration for the Resource Teacher

15

133 Total Semester Hours

¹Two years of the same foreign language are required.

²Three science courses (12 semester hours) composed of both biological and physical sciences are required. PH SC 108 and 107 and BIOL 109 are recommended. Eight of these hours must be a two-semester sequence.

³ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.

⁴See General Education Requirements.

⁵Must be taken as shown during the spring semester of the junior year.

⁶Courses must be taken concurrently fall semester of senior year.

DEPARTMENT OF PUBLIC HEALTH SCIENCES

The Department of Public Health Sciences prepares students for careers in the health care field, one of the largest industries in the United States. It includes hospitals and other medical service providers, public health organizations, health insurance companies, pharmaceutical and medical supply companies, and community and non-profit health agencies. The rapidly changing health care field needs graduates to a) assist the public in maintaining better health and avoid premature illness; b) work in teams to collect, analyze, and interpret health data; and c) manage health services efficiently and effectively to reach all groups in our society.

Students learn who is endangered by health problems such as substance abuse, violence, homelessness, teen pregnancy, inadequate primary health care, serious health care financing problems, and chronic illness. They learn the kinds of programs and social policies that assist people in overcoming these problems. They gain skills necessary to implement, manage, and evaluate health programs and health policies. Plans of study can be arranged in health promotion and education, health systems research, health information systems, and preprofessional studies for premedicine, dentistry, occupational therapy, and physical therapy.

HEALTH SCIENCE

Bachelor of Science

The Health Science undergraduate degree program prepares students for careers promoting health in a variety of settings and with various populations.

Departmental Requirements

All students enrolled in Health Science are required to have proof of Hepatitis B immunization on file in the school's Office of Student Affairs. It is recommended that students begin the three-injection series when admitted into the major. Senior students will need proof of CPR certification prior to beginning senior-level field experiences. Failure to comply with these requirements can result in being dropped from required Health Science courses.

HEALTH INFORMATION SYSTEMS CONCENTRATION

Freshman Year

First Semester

- 4 - CP SC 101 Computer Science I
- 3 - ENGL 101 Composition I
- 2 - HLTH 203 Overview of Health Care Systems
- 4 - MTHSC 106 Calculus of One Variable I
- 4 - Science Requirement¹

17

Second Semester

- 4 - CP SC 102 Computer Science II
- 3 - ENGL 102 Composition II
- 2 - HLTH 201 History and Philosophy of Public Health and Medicine
- 4 - MTHSC 108 Calculus of One Variable II
- 4 - Science Requirement¹

17

Sophomore Year

First Semester

- 1 - CP SC 221 Intro. to a Comp. Sci. Language
- 4 - CP SC 231 Computer Science III
- 3 - HLTH 298 Human Health and Disease
- 3 - MTHSC 119 Intro. to Discrete Methods
- 3 - PHIL 326 Science and Values
- 3 - Elective

17

Second Semester

- 4 - CP SC 241 Computer Science IV
- 3 - HLTH 240 Determinants of Health Behavior
- 3 - MTHSC 301 Statistical Theory and Methods I
- 3 - Cultural and Family Context Requirement²
- 3 - Oral Communication Requirement³

16

Junior Year

First Semester

- 3 - CP SC 360 Peripherals and File Design
- 3 - ECON 211 Principles of Microeconomics
- 3 - ENGL 304 Business Writing or
- 3 - ENGL 314 Technical Writing
- 3 - HLTH 303 Communication in Health Systems
- 3 - HLTH 380 Epidemiology

15

Second Semester

- 3 - CP SC 371 Systems Analysis
- 3 - CP SC 372 Intro. to Software Development
- 3 - HIST 172 or 173 Western Civilization
- 3 - HLTH 315 Social Epidemiology
- 3 - MGT 218 Mgt. Appl. of Microcomputers

15

Summer

- 3 - HLTH 350 Medical Terminology and Comm.
- 5 - HLTH 420 Health Science Internship

8

Senior Year

First Semester

- 3 - CP SC 462 Database Management Systems
- 3 - HLTH 440 Managing Health Service Org.
- 3 - HLTH 498 Improving Population Health
- 3 - MGT 418 Management Information Systems
- 3 - Humanities Requirement E.1³

15

Second Semester

- 3 - CP SC 463 Online Systems
- 3 - HLTH 460 Health Information Systems
- 3 - HLTH 490 Research and Evaluation Strategies for Public Health

7 - Elective

16

136 Total Semester Hours

¹See advisor. Select from BIOL 103/104, CH 101/102, or PHYS 122/124 and 221/223.

²Select from ANTH 201, 301, 351, SOC 201, 311, 460, 480.

³See General Education Requirements.

Note: Students must receive a minimum grade of C in all HLTH courses. Health courses may be repeated only once.

HEALTH PROMOTION AND EDUCATION CONCENTRATION

Freshman Year

First Semester

- 4 - BIOL 103 General Biology I
- 3 - ENGL 101 Composition I
- 2 - HLTH 203 Overview of Health Care Systems
- 4 - Chemistry Requirement¹
- 3 - Computer Skills Requirement²

16

Second Semester

- 3 - ENGL 102 Composition II
- 3 - HIST 172 or 173 Western Civilization
- 2 - HLTH 201 History and Philosophy of Public Health and Medicine
- 4 - Chemistry Requirement¹
- 3 - Mathematical Sciences Requirement³

15-16

Sophomore Year

First Semester

- 4 - BIOSC 222 Human Anatomy and Phys. I
- 3 - HLTH 298 Human Health and Disease
- 3 - PHIL 326 Science and Values
- 3 - PSYCH 201 Introduction to Psychology
- 4 - Elective

17

Second Semester

- 4 - BIOSC 223 Human Anatomy and Phys. II
- 3 - HLTH 240 Determinants of Health Behavior
- 3 - Cultural and Family Context Requirement⁴
- 3 - Oral Communication Requirement²
- 3 - Social Science Requirement⁵

16

Junior Year

First Semester

- 3 - HLTH 303 Communication in Health Systems
- 3 - HLTH 340 Health Promotion and Education
- 3 - HLTH 380 Epidemiology
- 1 - HLTH 398 Health Appraisal Skills
- 3 - NUTR 203 Principles of Human Nutrition
- 3 - Statistics Requirement⁶

16

Second Semester

- 3 - ENGL 304 Business Writing or
- 3 - ENGL 314 Technical Writing
- 3 - HLTH 315 Social Epidemiology
- 3 - HLTH 402 Principles of Health Fitness
- 3 - PSYCH 340 Life-Span Developmental Psych.
- 3 - Health Requirement⁷
- 3 - Social Science Requirement⁵

18

Summer

- 5 - HLTH 420 Health Science Internship

Senior Year

First Semester

- 3 - HLTH 440 Managing Health Service Org.
- 3 - HLTH 480 Community Health Promotion
- 3 - HLTH 498 Improving Population Health
- 3 - Social Science Requirement⁵
- 3 - Elective

15

Second Semester

- 3 - HLTH 450 Applied Health Strategies
- 3 - HLTH 490 Research and Evaluation Strategies for Public Health
- 3 - Concentration Area Requirement⁸
- 3 - Health Requirement⁷
- 3 - Humanities Requirement E.1²
- 3 - Elective

18

136-137 Total Semester Hours

¹See advisor.²See General Education Requirements.³MTHSC 101, 102, or 106.⁴Select from ANTH 201, 301, 351, SOC 201, 311, 460, 480.⁵See advisor. Select from ANTH, 201, 301, 351, RS, 301, (SOC) 459, SOC 201, 311.⁶EX ST 301, MTHSC 203, or 301.⁷See advisor. Select from HLTH 310, 320, 350, 400, 410, 415, 430, 431.⁸Health-related course outside of major, approved by advisor.

Note: Students must receive a minimum grade of C in all HLTH courses. Health courses may be repeated only once.

HEALTH SYSTEMS RESEARCH CONCENTRATION

Freshman Year**First Semester**

- 3 - ENGL 101 Composition I
- 2 - HLTH 203 Overview of Health Care Systems
- 4 - MTHSC 106 Calculus of One Variable I
- 3 - Computer Skills Requirement¹
- 4 - Science Requirement²

16

Second Semester

- 3 - ENGL 102 Composition II
- 3 - HIST 172 or 173 Western Civilization
- 2 - HLTH 201 History and Philosophy of Public Health and Medicine
- 4 - MTHSC 108 Calculus of One Variable II
- 4 - Science Requirement²

16

Sophomore Year**First Semester**

- 3 - ECON 211 Principles of Microeconomics
- 3 - HLTH 298 Human Health and Disease
- 4 - MTHSC 206 Calculus of Several Variables
- 3 - PHIL 326 Science and Values
- 4 - Elective

17

Second Semester

- 3 - HLTH 240 Determinants of Health Behavior
- 4 - MTHSC 208 Intro. to Ord. Diff. Equations
- 3 - MTHSC 311 Linear Algebra
- 3 - Cultural and Family Context Requirement¹
- 3 - Oral Communication Requirement¹

16

Junior Year**First Semester**

- 3 - ENGL 304 Business Writing or
- 3 - ENGL 314 Technical Writing
- 3 - HLTH 303 Communication in Health Systems
- 3 - HLTH 380 Epidemiology

- 3 - IE 380 Methods of Operational Research I
- 3 - MTHSC 302 Statistics for Science and Engr.

15

Second Semester

- 3 - HLTH 315 Social Epidemiology
- 3 - IE 381 Methods of Operational Research II
- 3 - MTHSC 400 Theory of Probability
- 3 - Humanities Requirement E.1¹
- 3 - Elective

15

Summer

- 5 - HLTH 420 Health Science Internship

Senior Year**First Semester**

- 3 - HLTH 412 Econ. and Financing of Hlth. Syst.
- 3 - HLTH 440 Managing Health Service Org.
- 3 - HLTH 498 Improving Population Health
- 3 - IE 482 Systems Modeling
- 3 - MA SC 310 Intro. to Management Science
- 3 - Elective

18

Second Semester

- 3 - ECON 314 Intermediate Microeconomics
- 3 - HLTH 460 Health Information Systems
- 3 - HLTH 475 Health Systems Research
- 3 - HLTH 490 Research and Evaluation Strategies for Public Health
- 3 - MA SC 312 Decision Models for Management
- 3 - MTHSC 406 Sampling Theory and Methods or
- 3 - MTHSC 407 Regression and Time-Series Analysis

18

136 Total Semester Hours

¹See General Education Requirements.²See advisor. Select from BIOL 103/104, CH 101/102, or PHYS 122/124 and 221/223.³Select from ANTH 201, 301, 351, SOC 201, 311, 460, 480.

Note: Students must receive a minimum grade of C in all HLTH courses. Health courses may be repeated only once.

PREPROFESSIONAL HEALTH STUDIES CONCENTRATION

Freshman Year**First Semester**

- 4 - BIOL 103 General Biology I or
- 5 - BIOL 110 Principles of Biology I
- 4 - CH 101 General Chemistry I
- 3 - ENGL 101 Composition I
- 2 - HLTH 203 Overview of Health Care Systems
- 3 - Computer Skills Requirement¹

16-17

Second Semester

- 4 - BIOL 104 General Biology II or
- 5 - BIOL 111 Principles of Biology II
- 4 - CH 102 General Chemistry II
- 3 - ENGL 102 Composition II
- 2 - HLTH 201 History and Philosophy of Public Health and Medicine
- 3 - Mathematical Sciences Requirement²

16-17

Sophomore Year**First Semester**

- 4 - BIOSC 222 Human Anatomy and Phys. I
- 3 - CH 223 Organic Chemistry
- 1 - CH 227 Organic Chemistry Lab.
- 3 - HLTH 298 Human Health and Disease
- 3 - PHIL 326 Science and Values
- 3 - Mathematical Sciences Requirement²

17

Second Semester

- 4 - BIOSC 223 Human Anatomy and Phys. II
- 3 - CH 224 Organic Chemistry
- 1 - CH 228 Organic Chemistry Lab.
- 3 - HLTH 240 Determinants of Health Behavior
- 3 - Cultural and Family Context Requirement¹
- 3 - Oral Communication Requirement¹

17

Junior Year**First Semester**

- 3 - HLTH 303 Communication in Health Systems
- 3 - HLTH 380 Epidemiology
- 4 - PHYS 207 General Physics I
- 3 - Concentration Area Requirement⁴
- 3 - Statistics Requirement³

16

Second Semester

- 3 - ENGL 304 Business Writing or
- 3 - ENGL 314 Technical Writing
- 3 - HLTH 315 Social Epidemiology
- 4 - PHYS 208 General Physics II
- 6 - Concentration Area Requirement⁴

16

Summer

- 5 - HLTH 420 Health Science Internship

Senior Year**First Semester**

- 3 - HLTH 440 Managing Health Service Org.
- 3 - HLTH 498 Improving Population Health
- 3 - Concentration Area Requirement⁴
- 3 - Social Science Requirement¹
- 4 - Elective

16

Second Semester

- 3 - HIST 172 or 173 Western Civilization
- 3 - HLTH 490 Research and Evaluation Strategies for Public Health
- 3 - Humanities Requirement E.1¹
- 6 - Elective

15

134-136 Total Semester Hours

¹See General Education Requirements.²See advisor.³Select from ANTH 201, 301, 351, SOC 201, 311, 460, 480.⁴See advisor. Liberal education courses from theme areas: Individuals, Groups, and Society; Physical Environment, Society, and Health; Social Justice and Society; or Science and Technology. (BIOCH 301 is recommended for pre-medicine majors.)⁵EX ST 301, MTHSC 203, or 301.

Note: Students must receive a minimum grade of C in all HLTH courses. Health courses may be repeated only once.

NURSING

Bachelor of Science

The School of Nursing offers a Bachelor of Science degree with a major in Nursing. The program is designed to prepare students for professional nursing practice in a variety of settings, such as hospitals, industry, clinics, and public health agencies. During the first two years, emphasis is on liberal arts and basic science courses arranged to provide a foundation for the nursing major. Junior and senior courses emphasize the study of nursing. Clinical nursing experiences, guided by the Nursing faculty, involve acute and community-based settings. Students are responsible for their own transportation to all off-campus clinical laboratory experiences, which may extend throughout the Upstate.

Each nursing major is required to carry, throughout the period of clinical laboratory assignments, a current and valid student nurse's professional liability insurance policy with minimum limits of liability of \$1,000,000 per occurrence and \$3,000,000 in aggregate. Documentation thereof must be provided to the Director of the School of Nursing. No student may participate in clinical learning activities without this insurance coverage.

To comply with clinical agency contract requirements and South Carolina law, students enrolled in nursing courses with a clinical laboratory must meet specific requirements listed in the *School of Nursing Student Handbook*.

The School of Nursing programs are accredited by the National League for Nursing Accrediting Commission, 350 Hudson St., New York, NY 10014; telephone (212) 989-9393, extension 451/155.

Freshman Year

First Semester

- 4 - BIOL 103 General Biology I
- 4 - CH 101 General Chemistry I
- 3 - ENGL 101 Composition I
- 3 - PSYCH 201 Introduction to Psychology
- 3 - SOC 201 Introduction to Sociology

17

Second Semester

- 4 - CH 102 General Chemistry II
- 3 - ENGL 102 Composition II
- 3 - MTHSC 101 Introduction to Probability
- 3 - NUTR 203 Principles of Human Nutrition
- 3 - Computer Skills Requirement¹

16

Sophomore Year

First Semester

- 4 - BIOSC 222 Human Anatomy and Phys. I
- 3 - EX ST 301 Introductory Statistics or
3 - MTHSC 203 Elem. Statistical Inference
- 4 - MICRO 205 Introductory Microbiology
- 3 - Humanities Requirement E.1¹
- 3 - Elective

17

Second Semester

- 4 - BIOSC 223 Human Anatomy and Phys. II
- 3 - Humanities Requirement E.2¹
- 7 - Elective

14

Junior Year

First Semester

- 3 - NURS 304 Pathophysiology for Health-Care Professionals
- 3 - NURS 310 Health Assessment
- 4 - NURS 312 Therapeutic Nursing Interventions
- 2 - NURS 320 Professionalism in Nursing
- 3 - NURS 340 Pharmacotherapeutic Nursing Interventions

15

Second Semester

- 7 - NURS 303 Nursing of Adults
- 3 - NURS 305 Psychosocial Nursing
- 2 - NURS 311 Intro. to Community Nursing
- 2 - NURS 323 Gerontology Nursing
- 3 - NURS 330 Research in Nursing

17

Senior Year

First Semester

- 5 - NURS 401 Mental Health Nursing
- 5 - NURS 411 Nursing Care of Children
- 5 - NURS 412 Nursing Care of Women and Their Families

- 3 - Oral Communication Requirement¹

18

Second Semester

- 5 - NURS 403 Complex Nursing of Adults
- 3 - NURS 405 Leadership and Mgt. in Nursing
- 3 - NURS 408 Senior Nursing Practicum
- 4 - NURS 415 Community Health Nursing

15

129 Total Semester Hours

¹See General Education Requirements.

Notes:

1. A minimum grade of C is required in all science courses for progression to junior year nursing courses.
2. A minimum grade of C must be achieved in all required nursing courses for progression to the next level. Students may repeat a nursing course one time only.
3. Students must pass didactic and clinical component to pass all clinical courses.
4. A minimum grade-point ratio of 2.0 is required for registration in each nursing course.

Registered Nurse BS Completion Program

The RN/BS curriculum offers an individualized study option for the registered nurse to obtain an advanced degree in nursing. Credits may be earned through an accelerated program of study, combining transfer credits for selected courses from accredited institutions of higher learning, credit by examination for previously completed nursing courses, and enrollment in courses at Clemson University. Registered nurses interested in pursuing a baccalaureate degree should contact the School of Nursing for curriculum requirements.

Freshman Year¹

First Semester

- 3 - ENGL 101 Composition I
- 3 - PSYCH 201 Introduction to Psychology
- 3 - Computer Skills Requirement²
- 8 - Science Requirement³

17

Second Semester

- 3 - ENGL 102 Composition II
- 4 - MICRO 205 Introductory Microbiology
- 3 - NUTR 203 Principles of Human Nutrition
- 3 - SOC 201 Introduction to Sociology
- 4 - Science Requirement³

17

Sophomore Year¹

First Semester

- 4 - BIOSC 222 Human Anatomy and Phys. I
- 3 - MTHSC 101 Introduction to Probability
- 6 - Humanities Requirement E.1 and E.2¹
- 3 - Elective

16

Second Semester

- 4 - BIOSC 223 Human Anatomy and Phys. II
- 3 - EX ST 301 Introductory Statistics or
3 - MTHSC 203 Elem. Statistical Inference
- 3 - Oral Communication Requirement²
- 4 - Elective

14

Junior Year

First Semester

- 7 - NURS 303 Nursing of Adults¹
- 4 - NURS 312 Therapeutic Nursing Interventions¹
- 5 - NURS 401 Mental Health Nursing⁴
- 5 - NURS 411 Nursing Care of Children⁴

21

Second Semester

- 3 - NURS 304 Pathophysiology for Health-Care Professionals
- 5 - NURS 307 Family Nursing in the Community
- 4 - NURS 313 Health Assessment Through the Lifespan
- 3 - NURS 330 Research in Nursing

15

Senior Year

First Semester

- 5 - NURS 403 Complex Nursing of Adults¹
- 3 - NURS 406 Issues in Professionalism
- 5 - NURS 412 Nursing Care of Women and Their Families⁴

13

Second Semester

- 3 - NURS 405 Leadership and Mgt. in Nursing
- 4 - NURS 415 Community Health Nursing
- 6 - Departmental Requirement⁵
- 3 - Elective

16

129 Total Semester Hours

¹Students are expected to transfer all courses listed in the freshman and sophomore years.

²See General Education Requirements.

³Twelve hours selected from BIOL 103, 104; CH 101, 102. Biology and chemistry must be represented; two of the courses must be in a sequence.

⁴Students are expected to receive credit by examination.

⁵See advisor for list of approved courses.

Notes:

1. All courses used to fulfill the support course requirements must be approved by the School of Nursing.

2. A minimum grade of C must be achieved in all nursing courses for progression to the next level. Students may repeat a nursing course one time only.
3. Seniors must have a cumulative grade-point ratio of 3.0 or higher on all college courses attempted to be eligible to enroll in courses numbered 800 or above (subject to approval of form GS6). See advisor for details.
4. To qualify for an undergraduate degree, a student must complete 30 of the last 36 credits at Clemson.

PARKS, RECREATION, AND TOURISM MANAGEMENT

Bachelor of Science

The curriculum in Parks, Recreation, and Tourism Management prepares students for a variety of careers in public and private leisure services. The undergraduate curriculum provides a broad exposure to the social, physical, and biological sciences required to manage leisure service programs and resources, such as those for municipalities, institutions, voluntary and youth-service agencies, management positions within the travel and tourism industry, and as resource managers of local, state, and federal parks and related lands and waters.

The flexible curriculum allows students to select from four emphasis areas: Community Leisure Services (including Sport Management), Recreation Resources Management, Therapeutic Recreation, and Travel and Tourism. This latitude permits accommodation of each student's career objectives to prepare for positions in corporate or commercial fitness center management, sport management, city/county/campus recreation, cultural arts management, commercial recreation, wilderness management, nature interpretation, park management, historic site management, rehabilitation services, leisure counseling, camp administration, recreation therapy, programs for people with disabilities or senior citizens, travel industry, resorts management, convention and visitor bureaus, theme parks, community tourism, and special event/festival planning, to name a few. Emphasis area appropriate minors are encouraged.

The Parks, Recreation, and Tourism Management program is accredited by the National Council on Accreditation (National Recreation and Parks Association/Council on Postsecondary Accreditation). Graduates are immediately eligible to apply to become a "Certified Leisure Professional," a valuable credential for professional advancement.

Graduate degrees offered are Master of Parks, Recreation, and Tourism Management; Master of Science; and Doctor of Philosophy.

The Department of Parks, Recreation, and Tourism Management is a South Carolina Commission on Higher Education "Commendation for Excellence" recipient and a top ranked program nationally.

Students will find it desirable to have a personal computer system meeting or exceeding current technology standards.

Freshman Year

First Semester

- 4 - BIOL 103 General Biology I¹ or
 - 3 - GEOL 101 Physical Geology¹ and
 - 1 - GEOL 103 Physical Geology Lab.¹
 - 3 - ENGL 101 Composition I
 - 3 - PRMT 101 Concepts of Leisure
 - 3 - PRMT 209 Professional Application of Microcomputers²
 - 3 - Mathematical Sciences Requirement³

16

Second Semester

- 4 - BIOL 104 General Biology II¹ or
 - 4 - Geology Laboratory Science¹
 - 3 - ENGL 102 Composition II
 - 3 - PRMT 205 Program and Event Planning
 - 3 - Mathematical Sciences Requirement³
 - 3 - Elective

16

Sophomore Year

First Semester

- 3 - PRMT 201 The Recreation/Leisure Environ.
- 1 - PRMT 206 Practicum I
- 3 - PSYCH 201 Introduction to Psychology⁴ or
 - 3 - SOC 201 Introduction to Sociology⁴
- 3 - Emphasis or Study Area Requirement⁵
- 3 - Humanities Requirement E.2⁶
- 3 - Literature Requirement⁷

16

Second Semester

- 1 - PRMT 207 Practicum II
- 3 - PRMT 308 Leadership and Group Processes in Recreation
- 3 - SPCH 250 Public Speaking
- 6 - Emphasis or Study Area Requirement⁵
- 3 - Social Science Requirement⁸

16

Junior Year

First Semester

- 3 - PRMT 321 Recreation Administration
- 1 - PRMT 404 Field Training I
- 9 - Emphasis or Study Area Requirement⁵
- 3 - Writing Intensive Requirement¹

16

Second Semester

- 3 - PRMT 305 Safety and Risk Management
- 3 - PRMT 309 Behavioral Concepts
- 7-8 - Emphasis or Study Area Requirement⁵
- 4-3 - Elective

17

Summer

- 6 - PRMT 405 Field Training II

Senior Year

First Semester

- 3 - PRMT 409 Methods of Recreation Research I
- 10 - Emphasis or Study Area Requirement⁵
- 3 - Elective

16

Second Semester

- 1 - PRMT 406 Senior Seminar
- 3 - PRMT 410 Methods of Recreation Research II
- 9 - Emphasis or Study Area Requirement⁵
- 3 - Elective

16

135 Total Semester Hours

¹The student must complete an eight-hour sequence in the same science. Therapeutic Recreation and Sport Management students must take the general biology sequence.

²PRMT 209 or other General Education Computer Skills course(s).

³See General Education Requirements.

⁴Therapeutic Recreation emphasis students must take PSYCH 201 and SOC 201.

⁵See advisor for Emphasis Requirement and Study Area lists that specify courses to be taken this semester. The actual credits may vary depending on the courses selected. There is some variation in emphasis hours distribution among the four emphasis areas and the study area concentrations.

⁶Sport Management Study Area students must take PHIL 103 or 344. All others see footnote 3.

⁷ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210.

⁸Sport Management Study Area students must take ECON 200 (preferred), 211, or 212. Therapeutic Emphasis students see footnote 4. All others see footnote 3.

Note: PRMT students select from four Emphasis Areas. These include Community Leisure Services, Recreation Resource Management, Therapeutic Recreation, or Travel and Tourism. Within Community Leisure Services, students may focus in the area of Sport Management by selecting from concentrations in Commercial Sport Management, Institutional Sport Management, Sports Communication Management, Sports Health and Fitness Management, and Sport Marketing.

COURSES OF INSTRUCTION

This list of courses includes for each course the catalog number, title, credit hours, class laboratory hours per week, and the description. Courses numbered 600 and above are graduate courses. Computer skills, oral communication, and writing intensive equivalencies are noted in brackets (e.g., [W.3]). Where courses are offered on a schedule, there is a designation F, S, M, or SS following the title, indicating whether the course is offered in the fall, spring, Maymester, or summer school.

ACCOUNTING

Professors: E. L. Bryan, L. S. Cash, J. R. Davis, T. L. Dickens, R. K. Doost, G. T. Friedlob, J. G. Louderback, R. E. Welton, Jr., *Director*; A. J. Winters; *Associate Professors:* A. L. Claire, L. S. Clark, J. J. McMillan, L. P. Ramsay, L. F. Schleifer; *Assistant Professor:* S. S. Chen; *Lecturers:* J. R. Madray, H. J. Manasa, M. A. Prater

ACCT 200 Basic Accounting 3(3,0) Designed as a general survey of accounting for the student requiring only a basic knowledge of principles and concepts. May not be taken by students in curricula requiring ACCT 201 or 203.

ACCT 201, H201 Accounting Concepts 13(3,0) Introduces accounting as a dynamic system providing financial information for economic decision making by owners, managers, investors, creditors, and others. Examines accounting from the perspective of the user, integrating basic financial, managerial, systems, audit and tax applications.

ACCT 202, H202 Accounting Concepts II 3(3,0) From the user's perspective, examines in more depth the role of accounting in debt/equity financing activities and decisions; investing activities and decisions; and operating activities and decisions. Briefly examines measuring, processing, and reporting financial information as a basis for better user understanding. *Preq:* ACCT 201.

ACCT 203 Financial Accounting 3(3,0) Emphasizes the principles and methods which influence the financial statements provided to external users. May not be taken by students in curricula requiring ACCT 200 or 201.

ACCT 204 Accounting Procedures 1(1,2) Lectures, demonstrations, and hands-on experience with accounting systems and analysis required to complete the accounting cycle and prepare financial statements. Intended for students who will enroll in ACCT 301. *Preq:* ACCT 201. *Coreq:* ACCT 202.

ACCT 301, H301 Intermediate Accounting I 3(3,0) In-depth treatment of the traditional financial accounting topics of current and noncurrent assets and liabilities. Emphasis is placed on basic theory, valuation, and measurement as well as presentation and analysis. *Preq:* ACCT 202 and 204.

ACCT 302, H302 Intermediate Accounting II 3(3,0) Continuation of ACCT 301. In-depth treatment of equity, cash flows, and selected accounting topics such as tax allocation, post-employment benefits, and leases. Emphasis is placed

on basic theory, valuation, and measurement as well as presentation and analysis. *Preq:* ACCT 301.

ACCT 303, H303 Cost Accounting 3(3,0) The application of cost analysis to manufacturing and distributing problems. Analysis of behavior characteristics of business costs and a study of principles involved in standard cost systems. Lectures and problems. *Preq:* ACCT 202, 204 or consent of instructor.

ACCT 307, H307 Managerial Accounting 3(3,0) Emphasizes internal use of accounting data by the manager in establishing plans and objectives, controlling operations, and making decisions involved with management of an enterprise. Cannot be taken for credit by Accounting majors. *Preq:* ACCT 202 or 203.

ACCT 322 Accounting Information Systems 3(3,0) Study of computer-based accounting systems with attention to systems design, application, internal control, auditing the system, and system security. *Preq:* CP SC 270. *Coreq:* ACCT 301.

ACCT 340 Internal Auditing Theory 3(3,0) Introduces the student to internal auditing and covers internal auditing standards, ethics, concepts, audit techniques, and reporting practices. Scheduling preference will be given to students who have completed 60, but not more than 100, credits. *Preq:* ACCT 301 and 322.

ACCT 399 Internship in Accounting 1-3(0,3-9) Preplanned, preapproved, faculty-supervised accounting internships designed to give students on-the-job learning opportunities that will support their classroom experiences. Credit will not be given for internships of less than six, full-time, consecutive weeks with the same internship provider. May be repeated for a maximum of three credits. To be taken Pass/Fail only. *Preq:* Junior standing and consent of instructor.

ACCT 404, H404, 604 Individual Taxation 3(3,0) Interpretation of Federal income tax laws, regulations, and court decisions with practice in application of these laws to the returns of individuals, partnerships, and corporations. *Preq:* ACCT 202 or 203 with consent of instructor.

ACCT 406 Business Taxation 3(3,0) Provides an introduction to the importance of taxation in business decision making. Emphasizes the interrelationship of taxes, the choice of business form, and various business transactions. Exposes students to the breadth of business decisions which are affected by the Federal Income Tax. *Preq:* ACCT 202 or 203 and consent of instructor.

ACCT 408 Retirement and Estate Planning 3(3,0) Provides students with an understanding of the tax consequences of personal financial, retirement, and estate planning. Subjects covered include the basic concepts of retirement, gift, income shifting, and estate planning. *Preq:* ACCT 404.

ACCT 410 Budgeting and Executive Control 3(3,0) Study and application of selected techniques used in the planning and control functions of business organizations. *Preq:* ACCT 303.

ACCT 415 Auditing 3(3,0) Professional and practical auditing theory. Review of internal controls, audit procedures, and development of audit programs for various types of businesses; consideration of auditor's professional and ethical standards. *Preq:* ACCT 301 and 322.

ACCT 445 Internal Auditing Practice 3(3,0) Expands the student's knowledge of internal auditing practice, including operation audits, organization audits, quality-control audits, and organization theory. *Preq:* ACCT 340.

AEROSPACE STUDIES

Professor: S. Edge, *Chair*; *Assistant Professors:* A. H. Palmer, R. D. Privette, L. A. Sneed, R. K. Stroud

A S 109 Air Force Today I 1(1,1) Course deals with the Air Force in the contemporary world through a study of the total force structure: strategic offensive and defensive, general purpose, and aerospace support. Leadership laboratory activities include drill fundamentals, customs, and courtesies of the service.

A S 110 Air Force Today II 1(1,1) Continuation of A S 109. Leadership laboratory includes drill, ceremonies, and an introduction to Air Force career opportunities.

A S 209 Development of Air Power I 1(1,0) Includes the study of the development of air power from balloons and dirigibles through the peaceful employment of U.S. air power in relief missions and civic action programs in the late 1960s and also the air war in Southeast Asia. Leadership laboratory provides experience in guiding, directing, and controlling an Air Force unit.

A S 210 Development of Air Power II 1(1,1) Continuation of A S 209.

A S 309 Air Force Leadership and Management I 3(3,1) Course emphasizing the individual as a manager. Individual motivational and behavioral processes, leadership, communication, and group dynamics are covered to provide a foundation for the development of the Air Force officer's professional skills. Students will prepare individual and group presentations, write reports, participate in group discussions, seminars, and conferences.

A S 310 Air Force Leadership and Management II 3(3,1) Continuation of A S 309, using the basic managerial processes involving decision making, utilization of analytical aids in planning, organizing, and controlling environment. Actual case studies are used to enhance learning and communication processes.

A S 409 National Security Policy I 3(3,1) Analysis of the role and function of the military officer in a democratic society and the relationships involved in civil-military interactions. Students will be expected to prepare individual and group presentations for the class, write reports, and participate in group discussions.

A S 410 National Security Policy II 3(3,1) Continuation of A S 409, examining the environmental context in which U.S. defense policy is formulated and implemented. Emphasis is placed on initial commissioned service and military justice. Students will be expected to prepare individual and group presentations for the class, write reports, and participate in group discussions, seminars, and conferences.

AFRICAN AMERICAN STUDIES

Professor: H. L. Suggs

A A S 301 Introduction to African American Studies 3(3,0) Study of African American experience from an Afrocentric perspective from colonial America to the present.

A A S 498 Seminar on African American Studies 3(3,0) Research/writing seminar on the African American experience. Selected topics and themes from 1900 to present. *Preq:* A A S 301, HIST 311, 312 or 339.

AGRICULTURAL AND APPLIED ECONOMICS

Professors: D. L. Barkley, L. L. Bauer, G. L. Bradford, M. D. Hammig, M. S. Henry, K. H. Kahl, E. L. McLean, S. E. Miller, G. J. Wells, *Chair*; Associate Professors: E. H. Kaiser, W. M. Smathers, Jr.; Assistant Professor: D. V. Rainey

AP EC 202 Agricultural Economics 3(3,0)ES Analytical survey of the various subdivisions of agricultural economics, to include farm organization, enterprise, land economics, marketing, farm prices, governmental farm policies, and the relation of agriculture to the national and international economy.

AP EC 302 Economics of Farm Management 3(2,3)F Economic principles underlying the organization and operation of agricultural firms and related business enterprises. Particular emphasis is directed to management aspects of the farm as a production unit. *Preq:* AP EC 202 or ECON 211.

AP EC 308 Quantitative Applied Economics 3(3,0)S Basic quantitative relationships in applied economics are examined and interpreted. Emphasis is placed on the mathematical aspects of applied economics. Microcomputer software will be utilized for problem solving.

AP EC 309, H309 Economics of Agricultural Marketing 3(3,0)F General course in marketing agricultural commodities with particular emphasis upon food products. Efficiency criteria, consumer behavior, market organizations and institutions, and marketing functions are analyzed. *Preq:* AP EC 202.

AP EC 313 Principles of Real Estate Appraisal 3(3,0)ES Introduction to basic principles and procedures of real estate appraisal. Topics include the real estate market, principles of valuation, legal concepts, and the application of the comparable sales, cost, and income approaches to real estate valuation. *Preq:* FIN 307 or consent of instructor.

AP EC 319 Agribusiness Management 3(3,0)F Study of the principles used in making management decisions and the application of these principles in agribusiness. Emphasis is given to the application of economics to the solution of problems facing managers of agricultural supply and marketing firms. *Preq:* AP EC 302 or 309.

AP EC 351 Agricultural Sales, Merchandising, and Advertising 3(3,0)ES Examination of professional selling and the roles and mechanisms of sales promotion and advertising in an agricultural environment. Topics include the sales process, promotion and merchandising devices, media advertising, and display. *Preq:* Junior standing.

AP EC 352 Public Finance 3(3,0)S Principles of financing government, sources of public revenue, objects of public expenditures, problems of fiscal administration, and the application of fiscal policies in stabilizing the national economy. *Preq:* Junior standing.

AP EC (C R D) 361 Introduction to Health-Care Economics 3(3,0) See C R D 361.

AP EC 402, 602 Production Economics 3(3,0)F Economic analysis of agricultural production involving the concept of the farm as a firm, principles for decision making, the quantitative nature and use of production and cost functions and their interrelations and application of these principles to resource allocation in farms and among areas. *Preq:* AP EC 308 and ECON 314.

AP EC 403, 603 Land Economics 3(3,0)S Study of the characteristics of land and of the physical, legal, social, and economic principles and problems relating to the control and use of land resources. *Preq:* AP EC 202 or ECON 200.

AP EC 409, 609 Commodity Futures Markets 3(3,0)ES Introduction to the economic theory, organization, and operating principles of agricultural commodity futures markets in the United States. Emphasis is placed on speculating, hedging, and investing in agricultural commodity futures contracts from the standpoint of the agribusiness entrepreneur. *Preq:* AP EC 202 or ECON 211.

AP EC (C R D) 411, 611 Regional Impact Analysis 3(3,0) See C R D 411.

AP EC (C R D) 412, 612 Spatial Competition and Rural Development 2(2,0) See C R D 412.

AP EC 413, 613 Advanced Real Estate Appraisal 3(3,0)S Topics covered include highest and best use analysis, data collection, and analyses. Advanced appraisal procedures for income, cost and comparable sales approach to real estate valuation will be stressed. Eminent domain, the appraisal of property in transition, and specialized property will be covered. *Preq:* AP EC 313, FIN 307, or consent of instructor.

AP EC 420, 620 World Agricultural Trade 3(3,0)S Practical considerations of agricultural trade and trade policy analysis are reviewed. The role of international institutions is considered. Special emphasis is placed on concepts of agricultural trade, analysis of trade policies of major trading partners/competitors, and export/import marketing of products. *Preq:* AP EC 309, ECON 412, or consent of instructor.

AP EC (CSENV) 426, 626 Cropping Systems Analysis 3(2,2)F See CSENV 426.

AP EC 433, 633 Agricultural Law and Related Environmental Issues 3(3,0)S Introduction to agricultural and agricultural-related environmental legal issues. Topics include a review of laws, agencies, programs, court structure, torts, taxation, biotechnology, land and water use, regulated industry and environment liabilities as they relate to agriculture and natural resources. *Preq:* LAW 322 or consent of instructor.

AP EC 452, H452, 652 Agricultural Policy 3(3,0)F Review of public agricultural policy programs in the United States and a critical examination of current and proposed government policies and programs affecting the agricultural sector of the economy. Included are economic con-

siderations as related to past and current farm price and income problems. *Preq:* AP EC 302 and 309.

AP EC 456, H456, 656 Prices 3(3,0)S Review of the basic theory of price under competitive conditions and various modifications; nature, measurement and causes of daily, seasonal and cyclical price fluctuations; geographical price relationships; nature, function and behavior of futures markets; government price programs. *Preq:* AP EC 308, ECON 314, EX ST 462.

AP EC 460, 660 Agricultural Finance 3(3,0)S Study of the principles and technique of financing in the agricultural sector. Topics include the capital situation in agriculture, concepts of farm financial management, use of credit, capital markets, lending agencies, and estate planning. *Preq:* ACCT 200 or 201, AP EC 202.

AP EC 475, 675 Economics of Wildlife Management and Policy 3(3,0) Integrated approach to the study of the economics of wildlife. Topics include determination of market and nonmarket value, single and multiple species management, enterprise cost and returns, marketing wildlife, leasing methods, complementarity and competitiveness with agricultural and forestry enterprises, and timber and crop damage cost estimates and control. *Preq:* AP EC 202, ECON 200, FOR 304, W F B 306, or consent of instructor.

AP EC 490 Selected Topics 1-15(0,2-30) Study of topics in applied economics. Topics may include classroom and/or field experience not normally covered in other classes. May be repeated for credit, but only if different topics are covered. *Preq:* Junior standing and/or consent of instructor.

AP EC (C R D) 491 Internship, Agribusiness, and Community and Rural Development 1-6(0,2-12) See C R D 491.

AGRICULTURAL EDUCATION

Associate Professor: C. D. White, Sr.; Assistant Professor: R. B. Radhakrishna; Instructor: J. R. Holliday

AG ED 100 Orientation and Field Experience 1(0,2)S Supervised observations and explanations of vocational agriculture teaching while serving as teacher aides. One full week of field experience in representative high schools is required.

AG ED 101 University Success Skills 2(3,0) Along with improving study and learning skills and maximizing all resources available for university success, people and procedures are featured as examples of successful characteristics for academics and careers. Selected activities provide self-determined strengths and weaknesses with prescriptive action. Limited to students in their first two semesters at Clemson.

AG ED 201 Introduction to Agricultural Education 3(2,3)F Principles of education, development of agricultural education, and an introduction to the formulation of instructional programs for the teaching of agricultural courses.

AG ED 400 Supervised Field Experience II 1(0,3)F Special emphasis is placed on enhancing existing knowledge and experiences of the students. Primary focus is on becoming acquainted with the student teaching center well in advance of the customary twelve-week directed teaching experience.

AG ED 401, 601 Methods in Agricultural Education 3(2,3) Appropriate methods of teaching vocational agriculture in high schools. Course includes procedures for organizing teaching programs, teaching high school students, and directing FFA activities.

AG ED 403, 603 Principles of Adult/Extension Education 3(3,0) An overview of adult/extension education and adult learning. Selection of adult education providers will be reviewed with emphasis on extension. *Prq:* Junior standing or consent of instructor.

AG ED 406 Directed Teaching 12(0,36) Guided participation in the professional responsibilities of a teacher of vocational agriculture including an intensive study of the problems encountered and the competencies developed. Twelve weeks of directed teaching in selected schools are required. *Prq:* AG ED 400, 401.

AG ED 407 Internship in Extension Education 6(0,18) Interest and needs of students enrolled will be considered in placing agriculture majors and minors for practical experience. Internship placements may include county extension offices and other appropriate extension units. Six weeks of supervised experience must be completed. May be repeated for a maximum of 12 credits. *Prq:* AG ED 400, Senior standing, and consent of instructor at registration.

AG ED 423, 623 Curriculum 2(2,0) Curriculum goals and related planning for career and continuing education programs.

AG ED 425, 625 Teaching Agricultural Mechanics 2(1,3) Organizing course content, conducting and managing an agricultural mechanics laboratory, shop safety, microteaching demonstrations of psychomotor skills, and methods of teaching manipulative abilities.

AG ED 428, 628 Special Studies in Agricultural Education 1-3(1-3,0) Students are provided with an opportunity to study individually or collectively selected topics and/or problems in agricultural education to meet the particular needs of the clientele enrolled. May be taken for a maximum of six semester hours credit.

AG ED 431, 631 Methods in Environmental Education 3(3,0) Study of various techniques appropriate for teaching environmental education. Instruction is applicable to elementary, high school, and adult-level teachers. Offered in summer school only.

AG ED 440, 640 Program Development in Adult/Extension Education 3(3,0) Principles, theory, and practice in planning and conducting educational programs in adult/extension settings. *Prq:* Junior standing or consent of instructor.

AG ED 445, 645 Evaluation of Adult/Extension Education Programs 3(3,0) Philosophy and methodology of conducting evaluations of adult educational programs such as extension or adult continuing education programs. Emphasis will be on designing and conducting different types of program evaluations, including appropriate data collection methods. *Prq:* Junior standing or consent of instructor.

AG ED 450, 650 Modern Topics and Issues 3(3,0) A major area of concern to teachers of agriculture and county agents will be selected for intensive study at least one semester prior to offering the course. Team teaching with faculty from other departments in the College of Agriculture, Forestry, and Life Sciences will be utilized when feasible. *Prq:* Senior standing or relevant experience.

AG ED (ED F, THRD) 480, 680 Educational Applications of Microcomputers 3(2,2) [C.3] See ED F 480.

AG ED (ED F, THRD) 482, 682 Advanced Educational Applications of Microcomputers 3(2,2) See ED F 482.

AGRICULTURAL MECHANIZATION

Professors: W. H. Allen, D. E. Brune, J. A. Collier, Y. J. Han, J. C. Hayes, *Chair:* D. E. Linville, R. E. Williamson; *Associate Professor:* R. B. Dodd, Jr.; *Instructor:* T. R. Garrett; *Lecturer:* R. G. Hammond

AG M 101 Introduction to Agricultural Mechanization and Business 1(0,3) Introduction to Agricultural Mechanization and Business program. An overview of the curriculum will be given and the opportunities for extracurricular activities explained. Long-term interaction between the department and alumni will be covered.

AG M 205 Principles of Farm Shop 3(2,3) Principles, techniques, and methods in the selection, proper use and maintenance of hand and power tools. Principal topics include welding, tool fitting, metalworking, woodworking, finishing and preserving, and heat treatment.

AG M 206 Agricultural Mechanization 3(2,3) The agricultural student is taught to apply physical principles and sound reasoning to the mechanization of modern agricultural production and processing enterprises. Planning efficient operational systems and wise selection of equipment, based on function and economic suitability are stressed. *Prq:* MTHSC 105, PHYS 207 or consent of instructor.

AG M 301 Soil and Water Conservation 3(2,3) Water management in agriculture is studied by applying principles of elementary surveying, mathematics, and fluid flow as related to soil-water-vegetation complexes in erosion control, water conservation, drainage, and irrigation.

AG M 303 Calculations for Mechanized Agriculture 3(2,3) Designed to enhance the student's ability to analyze and solve a wide range of problems requiring engineering technology. Laboratory periods will be used to introduce the student to microcomputer hardware. Basic programming and typical applications to agricultural mechanization problems are included. *Prq:* PHYS 207 or consent of instructor.

AG M 401, 601 Environmental Control for Plants and Animals 1(1,0) Basic concepts of environmental control for plant and animal production and human housing are presented. Elements include heat transfer, psychrometry, heating, cooling, ventilation, and heat/moisture balances. *Prq:* PHYS 200 or consent of instructor.

AG M 402, 602 Drainage, Irrigation, and Waste Management 3(2,3) Continuation of AG M 302.

Basic soil-water-plant relationships are used to determine the need for and methods of irrigation, drainage, and waste management. Topics covered will include irrigation methods, drainage needs, drainage methods, and waste-treatment methods. *Prq:* AG M 302.

AG M 403, 603 Structures for Plants and Animals 2(1,3) Structures for agricultural production systems are planned and designed with regard to function, materials, loads and component sizing, utilizing the approach of an engineering or construction technologist. *Prq:* PHYS 200 or consent of instructor.

AG M 406, 606 Mechanical and Hydraulic Systems 3(2,3) Study of power transmission systems for agricultural production with emphasis on mobile equipment. Characteristics, requirements, and design of both V-belt drive and roller-chain drives are presented. Emphasis is on hydraulic power transmission systems, including pumps, actuators, control devices, and hydraulic circuitry. *Prq:* AG M 206, PHYS 207 or consent of instructor.

AG M 408 Equipment Sales and Service 3(3,0) Agricultural equipment sales and service techniques, inventory, and accounting procedures followed by the farm machinery industry.

AG M 452, 652 Farm Power 3(2,3) Study of tractors with emphasis on internal combustion engines and support systems necessary for their proper functioning. Application of power, maintenance, adjustment, and general repair are also considered. *Prq:* PHYS 207 or consent of instructor.

AG M 460, 660 Farm and Home Utilities 3(2,3) Course for undergraduate and graduate students in agriculture and related curricula, involving a study of electric and other utilities on the farm and in the home. Selection, installation, and maintenance of wiring systems, lighting systems, motors, controls, water systems, and waste disposal systems are emphasized. *Prq:* PHYS 208 or consent of instructor, Junior standing.

AG M 472 Seminar 1(1,0) Introduction to the agribusiness world, professionalism, current topics of special interest, and financial and legal implications of modern agricultural production. *Prq:* Senior standing in Agricultural Mechanization and Business or consent of instructor.

AG M 473 Special Topics in Agricultural Mechanization 1-3(1-3,0) Comprehensive study and application of new technologies and methods not covered in existing courses. Emphasis is placed on independent study using innovative approaches to problem solving. May be repeated for a maximum of six credits. *Prq:* Consent of instructor.

AGRICULTURE

Professors: L. L. Bauer, O. J. Dickerson, R. G. Halfacre, D. E. Linville, E. L. McLean, V. L. Quisenberry, P. A. Skewes, C. E. Thompson, S. U. Wallace, G. J. Wells; *Associate Professors:* M. Hall, M. E. Richardson; *Assistant Professor:* C. D. White

AGRIC 103 Introduction to Animal Industries 3(3,0) Fundamental and descriptive aspects of the animal industries as applied biology and major segments of food production and distribution systems. Subject matter will be presented by Animal and Veterinary Sciences Department.

AGRIC 104, H104 Introduction to Plant Sciences 3(3,0)S Fundamental course in plant sciences, including agronomic and horticultural crops of the major agricultural areas of the world and emphasizing the crops of South Carolina.

AGRIC 105 Agriculture and Society 3(3,0)F Examination of the structure, function, and importance of the food and resource base, production, supply, marketing, demand, capital, labor markets, and consumption behavior in the U.S.; economic and sociological issues affecting U.S. agriculture.

AGRIC 200 Agricultural Applications of Microcomputers 3(2,2) [C.3] Overview of microcomputer hardware and software encompassing word processing, spreadsheet, database management, utility, and graphic communications. Also included are specialized farm and agribusiness management and decision-making programs and criteria for evaluating and selecting hardware.

AGRIC (EN SP) 315, H315 Environment and Agriculture 3(3,0) Survey of the interrelationships of the environment and current agriculture and agricultural practices to include both the environmental impacts of agriculture and the role of agriculture in conservation and improving the environment. *Preq:* Sophomore standing and two semesters of biology or chemistry.

AGRIC 440, 640 Microclimatology 3(3,0) Study of energy balance in earth's atmosphere and soil: solar and thermal radiation, air and soil temperature, humidity, evaporation and the hydrologic cycle, wind fields. Weather variables to describe microclimates and the energy balance of plants, animals, and insects. Modification of microclimates. Rural and urban climates. *Preq:* PHYS 240 or equivalent or consent of instructor; second semester Junior or Senior standing.

AGRIC H491 Senior Honors Research 3(1,6) Senior division honors research in an agricultural sciences curriculum. Open to approved Honors Program students only. In consultation with and under the direction of a professor, student will select a research topic, conduct experiments, record data, and make an oral presentation of results to the College Honors Program Committee.

AGRIC H492 Senior Honors Research 3(1,6) Continuation of AGRIC H491. Senior division honors research in an agricultural sciences curriculum. Upon termination of the research project, student will submit a formal written report and make a final oral presentation of results to the College Honors Program Committee. Professor-student discussions of additional topics will be arranged.

AMERICAN SIGN LANGUAGE

Lecturer: A. Brant

A S L 101 American Sign Language I 4(3,1) Introduction to the basics of American Sign Language, its history, and culture. Visual-gestural communication techniques will be used.

A S L 102 American Sign Language I 4(3,1) Continuation of A S L 101 and culture, to develop further communicative competencies. Proficiency oriented with the use of visual-gestural communication skills. *Preq:* A S L 101 or permission of instructor.

A S L 201 American Sign Language II 3(3,0) Continuation of A S L 102. Covers additional vocabulary, sentences, and grammar structures. Main focus is on conversational and receptive skills as well as a better understanding of Deaf culture. *Preq:* A S L 102 or permission of instructor.

A S L 202 American Sign Language II 3(3,0) Continuation of A S L 201, concentrating on intermediate conversational and discourse skills using American Sign Language, more complex American Sign Language grammar, reading comprehension, and composition of short stories, narratives, and dialogues with an emphasis on topics related to the Deaf community. Class will be conducted totally in American Sign Language using visual-gestural communicative techniques. *Preq:* A S L 201 or permission of instructor.

ANIMAL AND VETERINARY SCIENCES

Professors: J. A. Bertrand, G. P. Birrenkott, Jr., A. B. Bodine II, D. L. Cross, J. R. Diehl, T. Gimenez, D. M. Henricks, *Chair*; L. W. Hudson, T. C. Jenkins, J. C. McConnell, Jr., D. V. Maurice, T. R. Scott, P. A. Skewes, J. C. Spitzer, C. E. Thompson, R. J. Thurston; *Associate Professors:* A. K. Greene, M. A. Hall, M. E. Richardson; *Assistant Professor:* C. A. Adams

AVS 100 Orientation to Animal, Dairy, and Veterinary Sciences 1(2,0)F Study of the role of animal agriculture in the world today with emphasis on supply and demand of end products and careers available in the animal industry.

AVS 101 Dairy Foods 1(1,0) Production aspects of dairy foods from the farmer to the consumer including such products as ice cream, yogurt, and various cheeses; the use of these foods for nutrition and pleasure. Students who have received credit for ADVSC 307 will not be allowed to enroll in or receive credit for AVS 101.

AVS 102 Mammalian Reproduction 1(1,0) Physiology and endocrinology of the reproductive processes in male and female mammals with emphasis on farm animals. Control of reproductive cycles, diseases, sexuality, and effects of drugs on reproduction will be discussed.

AVS 108 Animal and Dairy Science Techniques 1(0,2)S Basic principles in the handling of livestock and techniques of animal industries are discussed. Basics of animal anatomy and equipment and facilities used in animal production are presented.

AVS 110 Avian Pets—Biology and Owner Responsibilities 1(1,0)F Systematic coverage of the many types of birds that humans keep as social companions. Nutrition, environmental considerations, reproductive habits, health, and legal and economic aspects of these pets are considered.

AVS 120 Poultry Techniques 1(0,2)F Basic principles in the handling and production of poultry are discussed and demonstrated. Student will receive hands-on experience and visit commercial operations to view equipment, facilities, and production techniques. *Preq:* Consent of instructor.

AVS 201 Poultry Husbandry 3(3,0)F Study of the principles of poultry production and marketing and of the anatomy and physiology of the eco-

nomically important poultry and game bird species. *Preq:* Consent of instructor.

AVS 202 Introductory Animal Sciences 4(4,0)F Systematic coverage of the basic principles involved in breeding, feeding, management, and product marketing in beef and dairy cattle, swine, sheep, goat, horse, and poultry operations.

AVS 203 Dairy Science Techniques 1(0,2)F Laboratories designed to demonstrate the basics of breeding, feeding, and management of dairy cattle, quality control of milk, and processing of milk and dairy products. *Preq:* AVS 108.

AVS 204 Horse Care Techniques 1(0,2) Common skills to safely handle, restrain, and work around horses with special emphasis on those management strategies to optimize the health, comfort, and productivity of the horse. *Preq:* AVS 108.

AVS 205 Light Horse Management 2(1,2)F Light horse industry—development of breeds and their uses. Breeding, feeding, and management of light horses. Fundamental instruction in equitation. *Preq:* AVS 202 and 204 or consent of instructor.

AVS 210 Animal Science Techniques 1(0,2)F Livestock handling techniques used in the animal industry are discussed. Principles of animal care and management for livestock production are emphasized. *Preq:* AVS 108.

AVS 202 Principles of Livestock Selection 2(1,2)S Pedigrees, performance records, and visual appraisal techniques will be integrated to teach students to identify livestock to be kept for breeding purposes. Students enrolled in the course are eligible to compete in intercollegiate selection contests.

AVS 303 Livestock Evaluation 2(1,2)F Modern selection parameters are integrated with visual appraisal in the identification of body traits that will ultimately affect the market grades and economic value of live animals and their carcasses.

AVS 304 Evaluation of Dairy Products 2(1,2)S Emphasis is on sensory evaluation of dairy products. Discussion of basic principles of organoleptic evaluation, fundamental rules for scoring and grading dairy products. Evaluation of all classes of dairy products based on established grades and score cards.

AVS 305 Meat Grading and Selection 2(1,2)S Classification, grading, and selection of beef, lamb, and pork carcasses, and wholesale cuts and factors influencing quality and value will be studied. Students in this course are eligible to compete in intercollegiate meat-judging contests.

AVS 309 Principles of Equine Evaluation 2(1,3) Study of conformation as it relates to locomotion, soundness, and breed standards is taught. Included are the rules and regulations of performance events and appropriate management of these events. Considerable time will be spent judging classes and delivering oral reasons.

AVS 310 Animal Disease and Sanitation 3(3,0)S Basic principles of animal health. Course emphasizes disease prevention in beef cattle, dairy cattle, goats, horses, poultry, and swine. The most common and important diseases and zoonosis of farm animals are explained. *Preq:* AVS 202.

AVS 311 Dairy Cattle Selection 2(1,2)S Emphasis is on the selection of dairy cattle for profitable herd operations. Evaluation of herd classification, fitting, showing, and true types is made.

AVS 315 Animal Welfare 3(3,0) Discussion of past, present, and future human/animal interaction. Topics include wild animals, domestication, animal welfare organizations, animal rights organizations, welfare assessment, animal agriculture, animal research, and other current topics. *Prq:* Junior standing.

AVS 320 Veterinary and Medical Terminology 2(2,0) Promotes students' understanding and use of basic scientific/medical terminology and concepts, especially those of basic science, biology, anatomy, physiology, and medicine. *Prq:* BIOL 103 and 104.

AVS 323 Poultry and Poultry Products Evaluation 2(0,4) Selection of layers, broilers, and turkeys. Grading of poultry products according to USDA grade standards will also be studied. Students enrolled in this course are eligible to compete in intercollegiate poultry judging contests. May be taken for a maximum of four credits.

AVS 330 Animal Pathology 3(3,0)F Acquaints students with animal pathology including cell injury, inflammation, neoplasia, immunologic disease, and pathology of various organ systems. *Prq:* AN PH 301 or consent of instructor.

AVS 353 Meats 2(2,0)S Selection and grading of meat animals and carcasses. Practical work in slaughtering of animals and in the cutting, curing, and freezing of meats. Emphasis is on the identification of wholesale and retail cuts. *Prq:* AVS 108 and 202.

AVS 354 Meats Laboratory 1(0,3) Study of the chemical and physical composition of meat, meat hygiene, nutritive value, curing, freezing, and meat by-products. *Prq:* AVS 108 and 202.

AVS 355, 655 Poultry Products Grading and Technology 3(2,3)S Odd-numbered years. Factors important in the quality of poultry products are considered. The effects of production, handling, packaging, and storage on consumer acceptability are discussed. Quality evaluation will be considered from the standpoint of tenderness, flavor, microbiology, and USDA grades.

AVS 360 Internship 1-12(0,3-36) Off-campus, preplanned, supervised learning opportunity in an area related to animal, dairy, or veterinary science. Students will submit periodic written reports and a final written report. To be taken Pass/Fail only. Limited to Animal and Veterinary Sciences majors. *Prq:* Sophomore standing and consent of instructor coordinating internship.

AVS 370, H370 Principles of Animal Nutrition 3(3,0)S Familiarizes students with nutrients and feeds used in livestock and specialty animal production. Methods of evaluating common feedstuffs are covered along with a survey of the functioning of the various digestive systems. Practical aspect to feeding each species is covered. *Prq:* AVS 202, CH 101 and 102.

AVS 375, H375 Applied Animal Nutrition 3(2,2)S Students learn procedures for formulating diets that meet nutrient requirements of livestock and poultry, utilizing traditional mathematical approaches and computerized formulation.

Computerized least-cost formulation of diets is covered along with familiarization with feeding systems and approaches. *Prq:* AVS 202 and to be taken concurrently or to follow AVS 370.

AVS 385 Equine Behavior and Training 2(0,4) Basic understanding of horse psychology and how it can be modified. Students will learn how to safely handle, train, and work with horses both in-hand and under saddle. Includes preparation for such diverse events as sales and shows. *Prq:* AVS 108 and 202.

AVS 390 Practicum 1-3(0,3-9) On-campus, preplanned, supervised learning experience in an area related to animal, dairy, poultry, or veterinary sciences. Gives experience not covered in other classwork. May be repeated for a maximum of four credits. To be taken Pass/Fail only. *Prq:* Consent of instructor supervising practicum experience.

AVS 400, 600 Avian Physiology 2(2,0)S Even-numbered years. Detailed study of the structure and function of organ systems of avian species with emphasis on digestion and reproduction. Students are given an opportunity to study organ system(s) of their choice using quantitative physiological techniques. *Prq:* AVS 201, AN PH 301 or consent of instructor.

AVS 401, H401, 601 Beef Production 4(3,2)F Breeding, feeding, reproduction, and management of beef cattle are discussed. Emphasis is on production systems integrating disciplines of animal agriculture into management plans and alternatives. Practical applications of beef production and management practices are also presented. *Prq:* AVS 202 and 370.

AVS 402, 602 Poultry Management 4(3,2)S Odd-numbered years. Continuation of AVS 201. Emphasizes management, decision-making, and application of technology to the commercial production of poultry and poultry products. *Prq:* AVS 201 or consent of instructor.

AVS 403, 603 Laboratory Techniques 3(2,3)F Research and quality control techniques commonly used in dairy science and related agri-sciences. *Prq:* CH 101, 102.

AVS 404, 604 Dairy Cattle Feeding and Management 4(3,2)F Alternate years. Fundamental principles in the care, feeding, and management of dairy cattle of all ages. Topics include general consideration in selecting a breed and the individual cow, calf raising, growth and development of dairy heifers, care and maintenance of the milking herd, and feeding for milk production. *Prq:* AVS 202 and 370.

AVS 405 Advanced Selection and Evaluation 2(0,4)F Provides special and advanced training in selection and evaluation of breeding, performance, and market animals or their products. Species used are beef and dairy cattle, sheep, swine, and horses. *Prq:* AVS 302 or 303 or 304 or 305, 309 or 311 and consent of instructor.

AVS 406 Seminars and Related Topics 2(2,0) Provides opportunity to prepare and deliver orally technical information not fully covered in classwork, to aid in résumé preparation, to introduce interviewing skills, and to acquaint students with industry expectations for Animal and Veterinary Sciences graduates. *Prq:* SPCH 250.

AVS 407, 607 Equine Theriogenology 3(2,2)F Review of reproductive anatomy and physiology in the mare and stallion, induction of estrus and ovulation, practices for optimal reproductive efficiency, semen collection, preservation and transport, embryo transfer, regulatory aspects of reproduction by various breed registries, noninfectious and infectious diseases affecting reproduction, reproductive health management. *Prq:* AVS 453.

AVS 408, H408, 608 Pork Production 4(3,2)S Breeding, feeding, grading, marketing, and management of swine will be studied. Practical applications from all phases of the production cycle will be outlined in problem form to develop the student's problem-solving ability. *Prq:* AVS 202 and 370.

AVS 409, 609 Selected Topics 1-3(1-3,0) Topics of interest to students at the undergraduate, graduate, and professional levels. Provides experience with problems not covered in other courses or on thesis research. May be repeated for a maximum of six credits, but only if different topics are covered.

AVS 412, H412, 612 Horse Production 4(3,2)S Feeding, breeding, and management of the horse discussed in relation to health, genetics, reproduction, nutrition, and selection. *Prq:* AVS 202 and 370.

AVS 418, 618 Muscle Biology and Lean Meats 3(2,2) Biology of animal muscle, connective, fat, and bone tissue with laboratory emphasis on low-fat sausages and restructured, value added meat products. *Prq:* AVS 202.

AVS 422 Special Problems 1-3(0,3-9) Laboratory, library, or field study of problems related to animal, dairy, and veterinary sciences, emphasizing development and testing of hypothesis and reporting of results. May be repeated for a maximum of four credits. *Prq:* Junior standing and consent of instructor supervising the study.

AVS 430, 630 Dairy Processing I 4(3,3)F Alternate years. Processing and distribution of fluid milk and other dairy products with emphasis on composition, quality control, chemical microbiological, and public health aspects. *Prq:* BIOL 103, 104, CH 101, 102.

AVS 431, 631 Dairy Processing II 4(3,3)S Alternate years. Continuation of AVS 430, with emphasis on processing of cultured dairy products and frozen dairy products. Processing procedures, quality control, ingredients, formulations, and compositional and cultural characteristics of cultured and frozen dairy products are discussed. *Prq:* AVS 430

AVS 451, 651 Poultry Nutrition 2(2,0)F Odd-numbered years. Nutrient requirements of chickens, turkeys, and game birds and methods of determining these requirements are discussed. Deficiencies and excesses of vitamins and minerals and the effects of naturally occurring toxins are considered. Hand formulation and linear programming are introduced.

AVS 452, 652 Poultry Nutrition Laboratory 1(0,3) Provides training in basic laboratory skills and familiarizes students with common laboratory methods used in poultry nutrition.

AVS 453, H453, 653 Animal Reproduction 3(2,2)S Reproductive physiology and endocrinology of mammals with emphasis on farm animals and frequent reference to reproduction in labo-

ratory animals and humans. *Preq:* AVS 202 and AN PH 301.

AVS 455, 655 Animal Reproductive Management 1(0,3)S Physiology and endocrinology of pregnant and nonpregnant cows are discussed. Emphasis is on methods of artificial insemination, pregnancy detection, and computer recordkeeping to achieve a high level of reproductive efficiency in cattle. *Preq:* AVS 202, AN PH 301, and to be taken concurrently or to follow AVS 453.

AVS 458, 658 Avian Microbiology and Parasitology 3(3,0)F Even-numbered years. Agents causing poultry diseases; the diagnosis, prevention, and treatment of specific diseases and their economic and public health significance.

AVS 461, 661 Physiology of Lactation 2(2,0)S Anatomy and development of the mammary gland; physiological and biochemical regulation of mammary growth and milk secretion with emphasis on farm animals and reference to other mammals. *Preq:* AVS 202 and BIOCH 210.

AVS 470, H470, 670 Animal Breeding 3(3,0)S Fundamental principles relating to the breeding and improvement of livestock including variation, heredity, selection, linebreeding, inbreeding, crossbreeding, and other related subjects. *Preq:* AVS 202 or consent of instructor.

ANIMAL PHYSIOLOGY

(See also courses listed under Animal and Veterinary Sciences and Entomology)

Professors: G. P. Birrenkott, Jr., A. B. Bodine II, J. R. Diehl, H. E. Farris, Jr., T. Gimenez, D. M. Henricks, T. R. Scott, J. C. Spitzer, R. J. Thurston, J. R. Tomasso, Jr.; *Associate Professors:* J. M. Colacino, M. E. Richardson; *Adjunct Associate Professor:* W. R. Boone; *Adjunct Assistant Professors:* J. A. Long, W. E. Roudebush

AN PH 301 Physiology and Anatomy of Domestic Animals 4(3,3)F Physiology and associated anatomy of the body systems, including nervous, skeletal, muscular, respiratory, digestive, circulatory, urinary, reproductive, and endocrine systems. Designed primarily for students in Animal and Veterinary Sciences. *Preq:* BIOL 103, 104 or 110, 111.

AN PH 401 Selected Topics 1-3(1-3,0) Comprehensive study of selected topics of interest in animal physiology not covered in other courses. May be repeated once for a maximum of six credits, but only if different topics are covered.

AN PH 460, H460, 660 Systems Physiology 1(1,0)F Physiology of digestive and endocrine systems. *Coresq:* BIOSC 459 or consent of instructor.

ANTHROPOLOGY

Professor: J. M. Coggeshall

ANTH 201 Introduction to Anthropology 3(3,0) Cross-cultural examinations of contemporary human society; physical evolution of humans; development of societies and archaeological record; environmental impact of human societies today.

ANTH 301 Cultural Anthropology 3(3,0) The nature of human culture; the constants and variants in human behavior affecting technology, social relations, social control, family systems, language, religion and art. *Preq:* ANTH 201 or consent of instructor.

ANTH 320 North American Indian Cultures 3(3,0) American Indian ethnography, using the culture area approach in studying adaptations of native peoples; includes a brief survey of American Indians today. *Preq:* ANTH 201 or consent of instructor.

ANTH 351 Physical Anthropology 3(3,0) Study of humans as biological organisms. Examines human evolution, primate social behavior, human physiological variations and disease resistance, and human skeletal anatomy and forensics.

ANTH 401, 601 Cultures and the Environment 3(3,0) Examines the global impact of humans on the environment. Traces the prehistoric development and historical consequences of population growth, agriculture, political and economic complexity. Future implications are also discussed. *Preq:* ANTH 201 and Junior standing, or consent of instructor.

ANTH 403, 603 Qualitative Methods 3(3,0) Methods and techniques of qualitative field research, including participant observation, ethnographic interviewing, data analysis, and report writing. *Preq:* ANTH 201 or consent of instructor.

ANTH 495 Field Studies 1-6(1-2,2-12) Group field project in settings selected by the instructor to provide students with a variety of exposures to various cultural contexts. Including archaeological digs. Project progress and student interpretations of findings monitored by periodic group meetings and shared experiences. *Preq:* ANTH 403 or consent of instructor.

ANTH 498 Independent Study 3(1,6) Individual readings or projects in anthropological areas not covered in other courses. *Preq:* ANTH 201.

ARCHITECTURE

Professors: J. F. Barker, J. R. Caban, *Chair:* L. G. Craig, M. A. Davis, T. K. Doruk, R. J. Hogan, J. D. Jacques, Y. Kishimoto, R. B. Norman; *Associate Professors:* D. J. Allison, J. A. Burton, H. C. Harriton, N. J. Hurt, D. J. Hutton, G. W. Patterson, M. H. Rice, R. T. Silance; *Assistant Professors:* R. T. Huff, V. J. Jones, R. K. McGill; *Lecturers:* B. Doruk, I. Ioannou, A. H. Jacques, C. L. Martin, R. J. Miller, J. P. Wilkerson

ARCH 201 The Art of Architecture 3(0,6) Examines basic concepts of architectural design from historical models to contemporary examples. Seminar discussions complement studio exercises and projects which concentrate on principles of design, materials of construction, programmatic concerns, and design theories. *Preq:* DSGN 151 and 153; 152 and 154.

ARCH 403, 603 The Modern Architectural Movement 3(3,0) Seminar in the analysis and criticism of architectural and town building works. The course sequence will include historic and contemporary examples, literary searches, field trips, essays, and oral reports. *Preq:* Senior standing or consent of instructor.

ARCH 404, 604 Current Directions in Architecture 3(3,0) Critical analysis of the development and current directions of modern movements in architecture. *Preq:* Senior standing or consent of instructor.

ARCH 405, 605 American Architectural Styles 1650-1950 3(3,0) Survey of American architectural styles and of the architects responsible for them, from the Colonial period to our recent past. Considerable emphasis will be placed on identifying those architectural elements which serve as clues in determining a building's architectural style.

ARCH 412, 612 Architectural History Research 3(3,0) Directed investigations related to the art and architectural heritage of Italy.

ARCH 414, 614 Design Seminar 3(3,0) Exploration of topical issues in architecture, art, construction, and planning.

ARCH 415, 615 Field Sketching 3(0,6) Study of media and techniques for expression, representation, and visual analysis through freehand perspective field drawing of the built and natural environment. *Preq:* School of Design and Building studies with Junior standing or consent of instructor.

ARCH 416, 616 Field Studies in Architecture and Related Arts 3(0,9) Documentation and analysis of architectural structures observed during European travels in graphic and written form.

ARCH 421 Architectural Seminar 3(3,0) Lectures and seminars dealing with pertinent topics related to environmental and technological considerations in architecture and the building industry. *Preq:* Senior standing or consent of instructor.

ARCH 422 New Directions Seminar 3(3,0) Exploration into careers which relate directly (i.e., construction law) or indirectly (i.e., public relations) to the making of our built environment.

ARCH 424, 624 Product Design 3(0,9) Furniture and product system design with emphasis on ergonomics and the relationship of form and materials. *Preq:* Senior standing and consent of instructor.

ARCH 425, 625 Energy in Architecture 3(3,0) Climate design methodology and its influence on building energy patterns and architectural form. *Preq:* Senior standing and consent of instructor.

ARCH 426, 626 Architectural Color Graphics 3(3,0) Architectural color graphics by computer. Theories of color classification and interaction; application of color theories to art and architecture. *Preq:* Consent of instructor.

ARCH 427, 627 Advanced Color Graphics 3(3,0) Theories of color classification and interaction; three-dimensional color modeling by computer; advanced application of color theories to art and architecture. *Preq:* ARCH 426 or consent of instructor.

ARCH 428, 628 Computer-Aided Design 3(2,3) Introduction to the concepts, skills, and applications of computer-aided design as they relate to the practice of architecture. *Preq:* Senior standing or approval of instructor.

ARCH 429, 629 Architectural Graphics 3(3,0) Designed to provide students with an understanding of the concepts, skills, techniques, and strategies of visual presentation/graphics as they relate to the design professions—architects/landscape architects. *Preq:* Junior, Senior, Graduate standing, or consent of instructor.

ARCH 430, 630 Theories and Philosophies of Technology and Architecture 3(3,0) Theoretical and practical examination of technology and architecture from pre-modern and modern viewpoints to study its nonneutral role in shaping and reflecting knowledge, beliefs, and actions within a cultural context.

ARCH 440 New York Field Study 3(3,0) Study of architecture, art, planning, and urban design of New York. Two weeks of residence is required with scheduled field trips to relevant sites in all five boroughs, with counseling to determine research interests. Guidance is provided to resources in the city. A final report is required.

ARCH 485, 685 Health Care Facilities Systems 3(3,0) Introduces the concepts, organization, and direction of health and health-care services within the context of health-care delivery systems. Special emphasis is placed on mental and physical health-care facilities concepts. *Preq:* Consent of instructor.

ARCH 488, 688 Health Care Facilities Programming Techniques 3(3,0) Seminar on recent research and innovations in health-care facilities programming and original investigation of assigned programming problems. *Preq:* Consent of instructor.

ARCH 490, H490 Directed Studies 1-5 Comprehensive studies and research of special topics not covered in other courses. Emphasis is on field studies, research activities, and current developments in architecture. May be repeated for a maximum of ten credits. *Preq:* Consent of department chair.

ARCH 557 Architecture Studio 6(0,18) City planning design and the development of complex building solutions.

ARCHITECTURE CHARLESTON PROGRAM

(See courses listed under each field of study.)
Assistant Professor: R. T. Huff, Director

Located in Charleston, South Carolina, this program is available to qualified undergraduate students in Architecture, Art, Construction Science and Management, and Landscape Architecture. Studio work is oriented toward design within this historic seaport setting. Students also enroll in classes at the University of Charleston campus. The program is enriched by visiting scholars and professionals from the area.

ARCHITECTURE OVERSEAS PROGRAM

(See courses listed under each field of study.)
Lecturer in Residence: R. J. Miller; Lecturers: S. Fera, S. Fera

The Daniel Center for Urban Studies in Genoa, Italy, is available to qualified Master of Architecture, Construction Science and Management, Fine Arts, City and Regional Planning, and Professional Year Landscape Architecture students. Studio and classroom work is enriched by visiting scholars and complemented by scheduled field trips, both in Italy and continental Europe. Undergraduate Design students in their third or fourth year may also participate in the Italian program.

ART

Professors: S. A. Cross, W. W. Lew, Chair; M. V. Vatalaro, S. M. Wang; Associate Professors: D. M. Detrich, T. W. Dimond, M. R. Hudson, J. A. Stockham; Lecturers: C. L. Martin, D. C. Woodward-Detrich

ART 103 Visual Arts Studio 3(0,6) Studio projects in basic visual elements and principles. The development of creative design process, visual organization, and design skills are introduced as a foundation for further study in visual arts.

ART 205 Beginning Drawing 3(0,6) Study of drawing based on the premise that drawing is a foundation discipline in the visual arts. Basic materials and approaches associated with drawing are studied and applied through studio practice, augmented by critiques, demonstrations, and lectures. *Preq:* ART 103 or DESIGN 152 or consent of instructor.

ART 207 Beginning Painting 3(0,6) Introduction to basic materials, methods, and techniques of painting. Primary medium used is acrylic, and other painting media may also be introduced. Emphasis is placed on basic skills in painting plus individual creative development. *Preq:* ART 103 or DESIGN 152 or consent of instructor.

ART 209 Beginning Sculpture 3(0,6) Studio courses investigating the meaning of sculpture through traditional and nontraditional approaches. Establishes a working knowledge of material and process in several media. Personal expression is encouraged and enhanced by employment of problem-solving techniques. Static, temporal, installation and site specific sculpture will be explored. *Preq:* ART 103 or DESIGN 152 or consent of instructor.

ART 211 Beginning Printmaking 3(0,6) Studio course designed to introduce basic techniques of relief printing, intaglio, lithography, silkscreen, and papermaking. Each semester concentrates on two or three of these techniques. Coursework integrates printmaking processes and creativity. *Preq:* ART 103 or DESIGN 152 or consent of instructor.

ART 213 Beginning Photography 3(0,6) Introduction to the use of photography as an art medium. Lectures and studio work cover the utilization of the camera, processing and printing in black and white, with emphasis on perception and creative expression. *Preq:* ART 103 or DESIGN 152 or consent of instructor.

ART 215 Beginning Graphic Design 3(0,6) Introduction to the fundamental techniques, concepts, and principles of visual communication. Through a series of projects and studio work, students will explore techniques of communication through the use of type design, typography, photography, illustration, symbolism, and product design. Individual creative development will be stressed. *Preq:* ART 103 or DESIGN 152 or consent of instructor.

ART 217 Beginning Ceramics 3(0,6) Basic studio course introducing ceramic arts through its various processes and techniques. Hand building methods as well as throwing on the potter's wheel are developed. Weekly projects emphasize imagination, self-expression, and skill development. Ceramic history is introduced through slide lec-

tures. *Preq:* ART 103 or DESIGN 152 or consent of instructor.

ART 219 Beginning Papermaking 3(0,6) Designed to explore paper, not just as a surface to receive an image, but as a material capable of being an artistic expression in and of itself. *Preq:* ART 103 or DESIGN 152 or consent of instructor.

ART 305 Drawing 3(0,6) Study of human figure drawing with primary emphasis on drawing from live models. Student's drawing skills and fundamental understanding of the structure and form of the human figure are reviewed through studio practice, augmented by critiques, demonstrations, and lectures. *Preq:* ART 205 or consent of instructor.

ART 307 Painting 3(0,6) Continuation of ART 209 with increased emphasis on personal expression and growth in technical competence. Some study of painting history is included in studio activity. *Preq:* ART 207 or consent of instructor.

ART 308 Painting Research I 1-3(0,2-6) Continuation of ART 307. Technical and conceptual research in painting to further develop self-expression. Special projects will be developed in consultation with instructor. May be repeated for a maximum of five credits. *Preq:* ART 307 or consent of instructor.

ART 309 Sculpture 3(0,6) Continuation of ART 209 with increased emphasis on personal expression and content of work. Further exploration of materials and processes including an introduction to foundry casting and advanced welding techniques. Individual investigation into current and historical aspects of sculpture will be required. *Preq:* ART 209 or consent of instructor.

ART 310 Sculpture Research I 1-3(0,2-6) Continuation of ART 309. Technical and conceptual research in sculpture to further develop self-expression. Special projects will be developed in consultation with instructor. May be repeated for a maximum of five credits. *Preq:* ART 309 or consent of instructor.

ART 311 Printmaking 3(0,6) Continuation of processes in beginning printmaking with emphasis on expanding the range and depth of technique. The relationship of technique and process to creative idea development is emphasized. *Preq:* ART 211 or consent of instructor.

ART 312 Printmaking Research I 1-3(0,2-6) Continuation of ART 311. Technical and conceptual research in printmaking to develop self-expression. Special projects will be constructed in consultation with instructor. May be repeated for a maximum of five credits. *Preq:* ART 311 or consent of instructor.

ART 313 Photography 3(0,6) Continuation of ART 213. Advanced techniques and more diverse types of film and paper are used in making images of personal and expressive nature. The design and construction of a view camera, printing in color, and multiple imagery may also be included. *Preq:* ART 213 or consent of instructor.

ART 314 Photography Research I 1-3(0,2-6) Continuation of ART 313. Technical and conceptual research to develop personal and expressive work in photography. Projects will be chosen in consultation with instructor. May be repeated for a maximum of five credits. *Preq:* ART 313 or consent of the instructor.

ART 315 Graphic Design 3(0,6) Continuation of concepts and techniques introduced in ART 215 with emphasis on more applied projects. Individual creative solutions are emphasized. *Prq:* ART 215 or consent of instructor.

ART 317 Ceramic Arts 3(0,6) Continuation of skill development leading to more challenging projects and independent efforts. Further exposure to ceramic history and ceramic technology is presented. *Prq:* ART 217 or consent of instructor.

ART 318 Ceramics Research I 1-3(0,2-6) Continuation of ART 317. Technical and conceptual research in ceramics for the purpose of self-expression. Projects are constructed in consultation with instructor. May be repeated for a maximum of five credits. *Prq:* ART 317 or consent of instructor.

ART 321 Art with the Computer 3(0,6) Studio course using the microcomputer as an art medium. Studies in imaging systems, with emphasis on the creative use of the medium for artistic expression. *Prq:* ART 103 or DSIGN 152.

ART 322 Art with Computer Research I 1-3(0,2-6) Continuation of ART 321. Technical and conceptual research to develop personal and expressive work in computer imaging. Projects will be chosen in consultation with instructor. May be repeated for a maximum of five credits. *Prq:* ART 321 or consent of instructor.

ART 405, 605 Advanced Drawing 3(0,6) Advanced level studies of drawing which explore the synthesis of refined drawing skills and philosophies of art. The student's understanding of drawing as a form of art is developed through studio practice augmented by critiques, demonstrations, lectures, field trips, and independent research. *Prq:* ART 305 or consent of instructor.

ART 406 Drawing Research II 1-3(0,2-6) Continuation of ART 405. Technical and conceptual research in drawing to further develop self-expression. Special projects are developed in consultation with instructor. May be repeated for a maximum of five credits. *Prq:* ART 405 or consent of instructor.

ART 407, 607 Advanced Painting 3(0,6) Advanced studio course in painting. Student selects painting media and is expected to develop a strong direction based on prior painting experience. Study of contemporary painters and directions is included. *Prq:* ART 307 or consent of instructor.

ART 408 Painting Research II 1-3(0,2-6) Continuation of ART 407. Technical and conceptual research in painting to further develop self-expression. Special projects will be developed in consultation with instructor. May be repeated for a maximum of five credits. *Prq:* ART 407 or consent of instructor.

ART 409, 609 Advanced Sculpture 3(0,6) Intensive independent studio concentration to further develop personal direction and content. Continued investigation of sculptural context, materials and processes, and relative historical research is emphasized. *Prq:* ART 309 or consent of instructor.

ART 410 Sculpture Research II 1-3(0,2-6) Continuation of ART 409. Technical and conceptual research in sculpture to further develop self-expression. Special projects will be developed in

consultation with instructor. May be repeated for a maximum of five credits. *Prq:* ART 409 or consent of instructor.

ART 411, 611 Advanced Printmaking 3(0,6) Culmination of process, techniques, and individual development. Students are expected to have mastered process and technique for the benefit of the image produced. Creativity and self-expression are highly emphasized as students select a process for concentrated study. *Prq:* ART 311 or consent of instructor.

ART 412 Printmaking Research II 1-3(0,2-6) Continuation of ART 411. Technical and conceptual research is further developed by students for the purpose of self-expression. Special projects are constructed in consultation with instructor. May be repeated for a maximum of five credits. *Prq:* ART 411 or consent of instructor.

ART 413, 613 Advanced Photography 3(0,6) Continuation of ART 313. Advanced problems in photography. *Prq:* ART 313 or consent of instructor.

ART 414 Photography Research II 1-3(0,2-6) Continuation of ART 413. Technical and conceptual research in photography to develop the student's creative vision. Projects will be developed in consultation with instructor. May be repeated for a maximum of five credits. *Prq:* ART 413 or consent of instructor.

ART 415 Advanced Graphic Design 3(0,6) Continuation of ART 315. Personal expression through communication techniques will be further explored. Individual projects will be emphasized. *Prq:* ART 315 or consent of instructor.

ART 417, 617 Advanced Ceramic Arts 3(0,6) Students are directed toward further development of ideas and skills. Glaze calculation and firing processes are incorporated to allow for a dynamic integration of form and ideas. *Prq:* ART 317 or consent of instructor.

ART 418 Ceramics Research II 1-3(0,2-6) Continuation of ART 417. Technical and conceptual research in ceramics for the purpose of self-expression. Projects will be chosen in consultation with instructor. May be repeated for a maximum of five credits. *Prq:* ART 417 or consent of instructor.

ART 420, 620 Selected Topics in Art 1-3(0,6-9) Intense course in studio art. May be repeated for a maximum of six credits, but only if different topics are covered. *Prq:* Senior standing or consent of instructor.

ART 471 Bachelor of Fine Arts Senior Studio I 5(0,15) Individual studio project directed by an instructor and determined by the student in consultation with the instructor. Usually focused upon a particular studio area, concept, or theme. *Prq:* Senior standing and completion of 300/400 sequence in the discipline in which they choose to complete senior studio.

ART 472 Bachelor of Fine Arts Senior Studio II 5(0,15) Individual studio project directed by an instructor and determined by the student in consultation with the instructor. Usually focused upon a particular studio area, concept, or theme. *Prq:* ART 471, Senior standing.

ART 490, H490, 690 Directed Studies 1-5(0,2-10) Study of areas in the visual arts not included in other courses or advanced work in addition to other courses. Directed studies must be arranged with a specific professor prior to registration.

ART AND ARCHITECTURAL HISTORY

Professor: E. C. Voelker; *Associate Professors:* J. B. LeBlanc, G. L. Walker; *Lecturer:* D. W. Houston

A A H 101, H101 Survey and Architectural History I 3(3,0) Comprehensive survey of art and architectural history of Western heritage as well as significant coverage of Asian, African, Native American, and South American art. The arts are studied within the contexts of history, geography, politics, religion and culture. Survey includes Ancient through Gothic.

A A H 102, H102 Survey of Art and Architectural History II 3(3,0) Survey of Renaissance, Baroque, and Neoclassical art and architecture. Introduction to the Modern Movement in Europe and America. *Prq:* A A H 101.

A A H 203, H203 History and Theory of Architecture I 3(3,0) First of a two-semester sequence of special topics and issues in the history of architecture. Emphasis is on architectural theory and practice in the past and present. Analysis of differing approaches to history: chronological, typological, thematic, phenomenological. *Prq:* A A H 102.

A A H 204, H204 History and Theory of Architecture II 3(3,0) Second of a two-semester sequence on special topics and issues in the history of architecture. Emphasis on typologies of the house, governmental buildings, and sacred architecture. New directions in architectural historiography. *Prq:* A A H 203.

A A H 205, H205 History and Theory of Art I 3(3,0) First of a two-semester sequence on special topics and issues in the history of art. Emphasis on stylistic developments and specific art movements. Analysis of art within the larger context of social, political, and religious history. Examination of art techniques and theory as they have developed. *Prq:* A A H 102.

A A H 206, H206 History and Theory of Art II 3(3,0) Second of a two-semester sequence on special topics and issues in the history of art. Continued emphasis on stylistic developments and art movements, with specific attention directed toward post-Renaissance art. Analysis of the influence of past history on modern. *Prq:* A A H 205.

A A H 210, H210 Introduction to Art and Architecture 3(3,0) One-semester lecture survey that introduces to the nonmajor an overview of art and architecture from different time periods and cultures. Students are encouraged to appreciate the contribution to art made by the great masters and to discern different styles, art techniques, and creative traditions.

A A H 305 Contemporary Art History 3(3,0) Study of contemporary art from World War II to the present, exploring the forces that have shaped the various movements and directions. *Prq:* A A H 206.

A A H H330 Honors Colloquium 3 Undergraduate honors colloquium with emphasis on interdisciplinary interpretations. An integration of art, architecture, landscape, and city planning. *Preq:* A A H 204 or 206 or consent of instructor.

A A H 391 Italian Studies Abroad 13-6(3-6,0) SS On-site exposure of specific works of art and architectural monuments in Italy, coupled with lectures and study problems. May be taught alternately as a compact short course during the academic year with a short stay in Italy or during the summer with an extended foreign experience. May not be taken Pass/Fail. *Preq:* A A H 204 or 206 or consent of instructor.

A A H 392 British Studies Abroad 13(3,0) On-site exposure to specific works of art and architectural monuments in Great Britain, coupled with lectures and study problems. May be taught alternately as a compact short course during the academic year with a short stay in Britain or during the summer with an extended foreign experience. May not be taken Pass/Fail. *Preq:* A A H 204 or 206 or consent of instructor.

A A H 393 French Visual Studies Abroad 13(3,0) On-site exposure to specific works of art and architectural monuments in France, coupled with lectures and study problems. May be taught alternately as a compact short course during the academic year with a short stay in France, or during the summer with an extended foreign experience. May not be taken Pass/Fail. *Preq:* A A H 204 or 206 or consent of instructor.

A A H 394 Northern European Visual Studies Abroad 13(3,0) On-site exposure to art and architecture in Northern European countries such as Belgium, Germany, and Holland coupled with lectures and study problems. May be taught alternately as a compact course during academic year with short stay in Northern Europe, or during summer with extended foreign experience. May not be taken Pass/Fail. *Preq:* A A H 204 or 206 or consent of instructor.

A A H 395 Special Topics in Visual Studies Abroad 13(3,0) On-site exposure to art and architecture in foreign countries, coupled with lectures and study problems. Different countries may be selected for study at faculty discretion. May be taught as a compact course during academic year with short stay in foreign country, or during summer with extended foreign experience. May not be taken Pass/Fail. *Preq:* A A H 204 or 206 or consent of instructor.

A A H 396 Special Topics in Visual American Studies 13(3,0) On-site exposure to specific works of art and architectural monuments throughout the U.S., coupled with lectures and study problems. May be taught alternately as a compact short course during the academic year with a short trip to areas of interest, or during the summer with extended travel. May not be taken Pass/Fail. *Preq:* A A H 204 or 206 or consent of instructor.

A A H 411, 611 Directed Research in Art and Architectural History 3(3,0) Comprehensive studies and research of special topics not covered in other courses. Emphasis is on field studies, research activities, and current developments in art history.

A A H 412, 612 Directed Research in Art and Architectural History 3(3,0) Continuation of A A H 411.

A A H 416 History of Landscape Architecture 3(3,0) Planetary survey of notable examples of mankind's constant efforts to arrange and bring order to his environment by design on the land. *Preq:* Junior standing or consent of instructor.

A A H 423, 623 Studies in the Art and Architecture of the Renaissance 13(3,0) Consideration of the visual arts and architectural monuments of the Renaissance (Western Europe from the 15th through the 18th centuries), with a study in depth of selected examples from the period. *Preq:* A A H 204 or 206 or consent of instructor.

A A H 424, 624 Studies in the Art and Architecture of the Renaissance II 3(3,0) Consideration of the visual arts and architectural monuments of the Renaissance (Western Europe from the 15th through the 18th centuries), with a study in depth of selected examples from the period. *Preq:* A A H 423.

A A H 428, 628 Nineteenth Century Visual Arts 3(3,0) Consideration of the visual arts of the 19th century: painting, sculpture, printmaking, ceramics, and so forth, in relation to the factors that have influenced the artist and the consequence on society. *Preq:* A A H 427.

A A H 429, 629 Studies in the Art and Architecture of India and the Far East 3(3,0) Consideration of the visual arts and architectural monuments of India and the Far East, with a study in depth of selected examples from the period. *Preq:* A A H 204 or 206 or consent of instructor.

A A H 430, 630 Twentieth Century Art 13(3,0) Acquaints students with the major artists' monuments and issues of the Modern period in art. Through lecture/discussions and the reading of primary sources, course places the major modern movements in the context of the period (1860s-1945). *Preq:* Consent of instructor.

A A H 432, 632 Twentieth Century Art II 3(3,0) Overview of trends in art and architecture since World War II. Specific artists, artworks, and movements will be presented in a socio/historic context with specific emphasis on the transition from a late-modernist to a post-modern perspective. *Preq:* Consent of instructor.

A A H 435, 635 Studies in Precolumbian Art and Architecture 3(3,0) Familiarizes students with the art and architecture of the Western Hemisphere's Precolumbian culture in Mexico, Central, and South America. *Preq:* A A H 102 or 210 or consent of instructor.

ASTRONOMY

Professor: D. D. Clayton; *Associate Professors:* T. F. Collins, P. J. Flower, D. H. Hartmann, M. D. Leising, B. S. Meyer

ASTR 101 Solar System Astronomy 3(3,0) Descriptive survey of the universe, with emphasis on basic physical concepts and the objects in our solar system. Related topics of current interest are included. For nonscience majors. May not be taken by students who have completed ASTR 301.

ASTR 102 Stellar Astronomy 3(3,0) Descriptive survey of the universe, with emphasis on basic physical concepts and galactic and extragalactic objects. Related topics of current interest are included. For nonscience majors. May not be taken by students who have completed ASTR 302.

ASTR 103 Solar System Astronomy Laboratory 1(0,2) Optional laboratory to accompany ASTR 101. Demonstrations, laboratory exercises, and planetarium visits supplement the lecture course. *Coreq:* ASTR 101.

ASTR 104 Stellar Astronomy Laboratory 1(0,2) Optional laboratory to accompany ASTR 102. Demonstrations, laboratory exercises, and planetarium visits supplement the lecture course. *Coreq:* ASTR 102.

ASTR (GEOL) 220 Planetary Science 3(3,0) See GEOL 220.

ASTR 302 Stellar Astrophysics 3(3,0) Study of the basic physical concepts necessary for understanding the sun, other stars, and their evolution. Topics include star formation, stellar structure and evolution, binary stars, and observational techniques. *Preq:* PHYS 221 or consent of instructor.

ASTR 303 Galactic Astrophysics 3(3,0) Study of basic physical concepts necessary for understanding the structure of the galaxy, the motions of the stars within it, the nature of the interstellar matter, other galaxies, the large-scale structure of the universe, and the origin of the solar system. *Preq:* PHYS 221 or consent of instructor.

ASTR 475 Selected Topics in Astrophysics 1-3(0-3,0-9) Comprehensive study of an area of astrophysics. Areas to be studied may include nucleosynthesis and stellar evolution, extragalactic distance scale, structure and evolution of galaxies, and large-scale structure of the universe. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* ASTR 302 or consent of instructor.

BIOCHEMISTRY

Professors: C. S. Brown, R. H. Hilderman, G. L. Powell, J. M. Shively, J. K. Zimmerman; *Associate Professor:* A. G. Abbott; *Assistant Professor:* W. R. Marcotte, Jr.; *Adjunct Professor:* D. M. Henricks

BIOCH 210 Elementary Biochemistry 3(3,0) Discussion of the kinds of compounds found in living organisms, their biochemical reactions and significance. *Preq:* CH 102.

BIOCH 211 Elementary Biochemistry Laboratory 1(0,3) Introduces students to basic biochemical techniques. *Preq:* BIOCH 210.

BIOCH 301 General Biochemistry 3(3,0) Introduction to the nature, production, and replication of biological structure at the molecular level and its relation to function. *Preq:* Organic Chemistry.

BIOCH 302 Molecular Biology Laboratory 1(0,3) Laboratory to accompany BIOCH 301. Introduction to fundamental laboratory techniques in biochemistry and molecular biology and a demonstration of some of the fundamental principles of molecular biology discussed in BIOCH 301. *Preq:* Organic Chemistry. *Coreq:* BIOCH 301.

BIOCH 406, 606 Physiological Chemistry 3(3,0) Chemical basis of the mammalian physiological processes of muscle contraction, nerve function, respiration, kidney function, and blood homeostasis is studied. Composition of specialized tissue such as muscle, nerve, blood, and bone and regulation of water, electrolytes, and acid-base balance is discussed. *Preq:* BIOCH 210 or Organic Chemistry.

BIOCH 423, 623 Principles of Biochemistry 3(3,0) Study of the chemistry of amino acids, monosaccharides, fatty acids, purines, pyrimidines, and associated compounds leads to an understanding of their properties and the relationship between structure and function that makes them important in biological processes. The use of modern techniques is stressed. *Preq:* CH 224 or equivalent.

BIOCH 431, H431, 631 Physical Approach to Biochemistry 3(3,0) Study of chemical and physical properties of amino acids, lipids, nucleic acids, sugars, and their biopolymers. Physical and mathematical analyses will be correlated with biological structure and function. *Preq:* BIOCH 301 with a grade of C or higher or consent of instructor. *Coreq:* Physical Chemistry.

BIOCH 432, H432, 632 Biochemistry of Metabolism 3(3,0) Study of the central pathway of carbohydrate, lipid, and nucleotide metabolism. Bioenergetics, limiting reactions, and the regulation and integration of the metabolic pathways are emphasized. *Preq:* BIOCH 423 or 431 or consent of instructor.

BIOCH 433, 633 General Biochemistry Laboratory I 2(0,4) Experiments selected to illustrate current methods used in biochemical research. *Preq:* Concurrent enrollment in BIOCH 423 or 431.

BIOCH 434, 634 General Biochemistry Laboratory II 2(0,4) Continuation of BIOCH 433. *Preq:* Concurrent enrollment in BIOCH 432.

BIOCH 436, 636 Nucleic Acid and Protein Biosynthesis 2(2,0) Examines how nucleic acids and proteins are synthesized in prokaryotic and eukaryotic cells. Designed for students interested in biochemistry, cell biology, molecular biology, and cell physiology. *Preq:* BIOCH 423, 431 or 432 or permission of instructor.

BIOCH 491, H491 Special Problems in Biochemistry 1-8(0-3,24) Orientation in biochemical research (i.e., experimental planning, execution, and reporting). May be repeated for a maximum of eight credits.

BIOENGINEERING

Professors: R. L. Dooley, Chair; S. Saha; *Associate Professors:* V. M. Gharpuray, M. LaBerge, R. A. Latour, Jr.; *Assistant Professor:* S. P. Massia

BIO E 201 Organs and Their Replacements 3(3,0) Provides engineering, biological, and physical science students with an overview of the replacement of human body parts and the problems related to artificial devices.

BIO E 302 Biomaterials 3(3,0) Study of metallic, ceramic, and polymer materials used for surgical and dental implants; materials selection, implant design, physical and mechanical testing; corrosion and wear in the body. In addition, physical and mechanical properties of tissue as related to microstructure are studied. *Preq:* CME 210 or consent of instructor.

BIO E 320 Biomechanics 3(3,0) Study of relation between biological and mechanical functions of musculoskeletal tissues such as bone, ligaments, muscles, cartilage, etc.; mechanics of human joints; analysis of implants and implant failure. *Preq or Coreq:* E M 304 or consent of instructor.

BIO E 401 Biomedical Design 3(3,0) Covers basic steps in designing medical devices intended for short- or long-term implantation. Materials selection, fabrication processes, performance standards, cost analysis, and design optimization are covered. Design project is required. For engineering majors only. *Preq:* BIO E 302, 320, E M 304.

BIO E 420 Sports Engineering 3(3,0) Study of engineering principles involved in sports: body systems in human motion, analysis of gait, basic performance patterns in athletic movements, performance improvements, design of sports equipment. *Preq:* BIO E 302 and 320 or consent of instructor.

BIO E 450, H450 Special Topics in Bioengineering 1-4(1-4,0) Comprehensive study of a topic of current interest in the field of biomedical engineering under the direct supervision and guidance of a faculty member. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Consent of instructor.

BIO E (C M E) 480, 680 Research Principles and Concepts 1(1,0) Introduces senior undergraduate and graduate students to the principles and practices of scientific research. Topics include developing scientific concepts, developing projects, pursuing research, collaborating in multidisciplinary teams, patenting and publishing technical and scientific information, and reviewing professional and ethical standards of performance. To be taken Pass/Fail only.

BIOLOGICAL SCIENCES

Professors: R. E. Ballard, N. D. Camper, L. A. Dyck, S. A. Gauthreaux, Jr., R. L. Hays, D. G. Heckel, T. M. McInnis, Jr., Chair; G. P. Noblet, E. B. Pivorun, E. E. Ruppert, J. E. Schindler, A. P. Wheeler, R. A. Wing, J. B. Wourms; *Associate Professors:* J. M. Colacino, R. R. Montanucci, T. P. Spira, D. W. Tonkyn

BIOSC 101 Frontiers in Biology I 1(1,0) Introduces Biological Sciences majors to recent advances in molecular and cellular biology. Areas covered include genetic engineering, genetics, cell biology and development. *Coreq:* BIOL 103 or 110 or permission of course coordinator.

BIOSC 102 Frontiers in Biology II 1(1,0) Introduces Biological Sciences majors to recent advances in organismal and evolutionary biology. Areas covered include ecology, evolution, behavior and organismal biology. *Preq:* BIOL 103 or 110 or consent of course coordinator.

BIOSC 205 Plant Form and Function 3(3,0) Introductory course designed for students majoring in plant sciences. Integrates lecture and laboratory and emphasizes fundamental structures and functions of higher plants. *Preq:* BIOL 103 or consent of instructor.

BIOSC 206 Plant Form and Function Laboratory 1(0,3) Laboratory for BIOSC 205. *Preq or Coreq:* BIOSC 205 or consent of instructor.

BIOSC 222 Human Anatomy and Physiology I 4(3,3) Basic introductory course in integrated human anatomy and physiology covering cells and tissues; integumentary, skeletal, muscular and nervous systems; sensory organs. Physiology is stressed. Structured primarily for nursing and other health related curricula. *Preq:* BIOL 103 or 110; CH 101 and 102 or 105 and 106.

BIOSC 223 Human Anatomy and Physiology II 4(3,3) Continuation of BIOSC 222 covering endocrine, reproductive, cardiovascular, lymphatic, respiratory, urinary, digestive systems; fluid and electrolyte balance. Physiology is stressed. *Preq:* BIOSC 222 or permission of instructor.

BIOSC 302, H302 Invertebrate Biology 3(3,0) In-depth survey and comparison of free-living invertebrate animals emphasizing functional anatomy, development, and evolutionary relationships. *Preq:* An introductory two-semester biology sequence with laboratory. *Coreq:* BIOSC 306.

BIOSC 303, H303 Vertebrate Biology 3(3,0) Comprehensive survey of vertebrate animals including their taxonomy, morphology, evolution, and selected aspects of the natural history and behavior. *Preq:* An introductory two-semester biology sequence with laboratory.

BIOSC 304, H304 Biology of Plants 3(3,0) Survey of the major groups of plants, their biology, diversity, and evolution. *Preq:* BIOL 104 or 111 or BIOSC 205.

BIOSC 305, H305 Biology of Algae and Fungi 3(3,0) Introduction to the biology of the major groups of algae and fungi. Emphasizes how select representatives of the algae and fungi are adapted to their environment through structural, physiological, and life-cycle modifications. *Preq:* BIOL 104 or 111 or BIOSC 205.

BIOSC 306 Invertebrate Biology Laboratory 1(0,3) Survey and comparison of the biology of living invertebrates, examples of which are drawn primarily from the southeastern coast of the United States. *Preq:* An introductory two-semester biology sequence with laboratory. *Coreq:* BIOSC 302.

BIOSC 307 Vertebrate Biology Laboratory 1(0,3) Comparative and phylogenetic study of the gross morphology of vertebrates. *Preq or Coreq:* BIOSC 303.

BIOSC 308 Biology of Plants Practicum 1(0,3) Laboratory exercises that explore the major groups of plants, their biology, diversity, and evolution. *Preq or Coreq:* BIOSC 304.

BIOSC 309 Algae/Fungi Practicum 1(0,3) Practice in the manipulation and examination of selected algae and fungi, with emphasis on culture techniques and examination of the structure and adaptations of the algae and fungi to different environments. *Preq or Coreq:* BIOSC 305.

BIOSC (W F B) 313 Conservation Biology 3(3,0) See W F B 313.

BIOSC 320 Field Botany 4(2,4) Introductory study of the taxonomy, ecology, and evolution of plants in their natural environment with an emphasis on identification and characteristics of representative species and plant communities in the Carolinas. Includes one or two required Saturday field trips. *Preq:* BIOL 104, 111, or BIOSC 205, or permission of instructor.

BIOSC 335 Evolutionary Biology 3(3,0) Introduction to the basic concepts and underlying principles of modern evolutionary biology. Topics include a historical overview of evolutionary theories, elementary population genetics, principles of adaptation, speciation, systematics and phylogenetic inference, fossil record, biogeography, molecular evolution, and human evolution. *Preq:* GEN 302 or equivalent.

BIOSC 336, H336 Computers in Life Sciences 3(1,4) Use of computers, video, and communication technologies in the life sciences is explored through demonstration, discussion, and collaborative projects that prepare students to use modern technology in research, learning, communicating, and public presentation of biological principles and phenomena. *Preq:* BIOL 104 or 111 or permission of instructor.

BIOSC 401, H401, 601 Plant Physiology 3(3,0) Relations and processes pertaining to maintenance, growth, and reproduction of plants, including absorption of matter and energy, water relations of the plant, utilization of reserve products and liberation of energy. *Preq:* BIOL 104 or 111 or BIOSC 205 and CH 102. *Coreq:* BIOSC 402.

BIOSC 402, 602 Plant Physiology Laboratory 1(0,3) Laboratory exercises and experiments designed to indicate the relations and processes which pertain to maintenance, growth and reproduction of plants, including absorption of matter and energy, water relations of the plant, utilization of reserve products, and liberation of energy. *Coreq:* BIOSC 401.

BIOSC 403, H403, 603 Protozoology 3(3,0) Survey of the protozoa with emphasis on organization and function. Representative types of both free-living and parasitic forms will be examined for each major taxon. *Preq:* BIOL 104 or 111.

BIOSC 404, H404, 604 Protozoology Laboratory 2(1,2) Laboratory exercises reinforce the material presented in BIOSC 403 and introduce students to techniques used in collection, preservation, and examination of protozoans. *Coreq:* BIOSC 403.

BIOSC 405, H405, 605 Molecular Genetics of Eukaryotes 3(3,0) Molecular genetic analyses of eukaryotes in relation to mutations and repair, complex phenotypes, biochemical pathways, short- and long-term regulation of gene expression, and evolution. *Preq:* GEN 302 or equivalent and one semester of biochemistry, or consent of instructor.

BIOSC 406, H406, 606 Introductory Plant Taxonomy 3(3,0) Introduction to the basic principles and concepts of plant systematics with emphasis on the plants of South Carolina. *Preq:* BIOL 104 or 111 or BIOSC 205. *Coreq:* BIOSC 407.

BIOSC 407, 607 Plant Taxonomy Laboratory 1(0,3) Introduction to basic techniques of plant taxonomy with laboratory and field emphasis on the flora of South Carolina. *Coreq:* BIOSC 406.

BIOSC 408, H408, 608 Comparative Vertebrate Morphology 3(3,0) Phylogeny and diversity of vertebrates and study of their comparative morphology, leading to an understanding of the relationships and functioning of living organisms. *Preq:* BIOL 104 or 111. *Coreq:* BIOSC 409.

BIOSC 409, H409, 609 Comparative Vertebrate Morphology Laboratory 1(0,3) Comparative anatomy of representative vertebrates. Methods used in preparing specimens for study and display. *Coreq:* BIOSC 408.

BIOSC 410, 610 Limnology 3(3,0) Detailed introduction to the physical, chemical, and biological interrelationships that characterize inland water environments. A fundamental approach to the interactions of components of the environment is developed at a theoretical level. *Preq:* Junior standing in a life science or consent of instructor.

BIOSC 411, H411, 611 Limnological Analyses 2(1,2) Examines a broad range of topics covered with both standing and running fresh waters. About one-third of the laboratory exercises address the major physical components of lakes and streams. The remainder provide rationale and methods for quantitative analyses of biota, as well as some integrated analyses of whole ecosystems. *Preq or Coreq:* BIOSC 410 or 443.

BIOSC (GEN) 416, 616 Recombinant DNA 3(3,0) See GEN 416.

BIOSC (GEN, MICRO) 418, 618 Biotechnology I: Nucleic Acids Techniques 4(2,4) Provides basic training in the manipulation of genetic information using recombinant DNA technology. Includes techniques in molecular cloning, Southern and Northern analyses, clone library construction. *Preq:* BIOCH 210 or 301, MICRO 305 or consent of instructor.

BIOSC 420, H420, 620 Neurobiology 3(3,0) Provides broad background in neurobiology. Topics include neuroanatomical structure-function; conduction in the neuron; neurite growth and development; neuromuscular junction; chemistry, physiology, and pharmacology of specific neurotransmitters and receptors; visual process; axoplasmic transport; hypothalamic-pituitary regulation; theories of behavior; theories of learning and memory. *Preq:* BIOCH 210 or 301 or consent of instructor.

BIOSC 425, 625 Introductory Mycology 3(3,0) Introduction to the biology of all the groups of fungi and some related organisms, with considerations of the taxonomy, morphology, development, physiology, and ecology of representative forms. *Preq:* BIOL 104 or 111 or BIOSC 205.

BIOSC 426, 626 Mycology Practicum 2(1,2) Application of the principles of mycological techniques, including isolation, culture, identification, and microscopic study of fungi. Examples from all major groups of fungi are included. *Preq or Coreq:* BIOSC 425.

BIOSC (B E) 430, 630 Engineering Modeling of Biological Systems 3(3,0) See B E 430.

BIOSC 432, H432, 632 Animal Histology 3(3,0) Structural and functional study of the basic tissues of animals and tissue makeup of organs. Emphasis on light microscopy level with selected tissue studied at the electron microscope level. *Preq:* BIOSC 303 or consent of instructor. *Coreq:* BIOSC 433.

BIOSC 433, H433, 633 Animal Histology Laboratory 2(1,2) Microscopic examination of basic animal tissue types and the tissue makeup of organs which comprise systems. *Coreq:* BIOSC 432.

BIOSC 435, H435, 635 Principles of Evolution 4(4,0) Introduction to the fundamental principles and major concepts of the evolutionary process in animals, including a consideration of evolutionary theories, adaptive processes in populations, and major evolutionary patterns and to the principles of classification and systematics. *Preq:* GEN 302 or consent of instructor.

BIOSC 440, H440, 640 Developmental Animal Biology 3(3,0) Events and mechanisms responsible for the development of multicellular animals. Gametogenesis, fertilization, embryonic development, cellular differentiation, morphogenesis, larval forms and metamorphosis, asexual reproduction, regeneration, malignancy, and aging are analyzed in terms of fundamental concepts and control processes. *Preq:* BIOCH 210 or 301 or consent of instructor. *Coreq:* BIOSC 450.

BIOSC 441, H441, 641 Ecology 3(3,0) Study of basic ecological principles underlying the relationships between organisms and their biotic and abiotic environments. Includes physiological, population, and community ecology, with applications of each to human ecological concerns. *Preq:* BIOL 104, 111 or BIOSC 205 or consent of instructor.

BIOSC 442, H442, 642 Biogeography 3(3,0) Study of patterns of distribution of plants and animals in space and time. *Preq:* BIOSC 302 or 303 and 304 or 305 or consent of instructor.

BIOSC 443, 643 Aquatic Ecology 3(3,0) Study of basic ecological principles and concepts as they apply to aquatic environments: rivers and streams, lakes and ponds, reservoirs, swamps, marshes, estuaries, and marine systems. *Preq:* Junior standing in a life science or consent of instructor.

BIOSC 445, H445, 645 Ecology Laboratory 2(1,2) Modern and classical approaches to the study of ecological problems discussed in BIOSC 441. Students are introduced to field, laboratory and computer-based analyses of plant and animal populations and communities. *Preq or Coreq:* BIOSC 441.

BIOSC 446, H446, 646 Plant Ecology 3(3,0) Ecology of plants in relation to their biotic and abiotic environments. Individual organisms, populations, and communities are considered with an emphasis on seed plants in terrestrial environments. *Preq:* BIOL 104, 111 or BIOSC 205 or consent of instructor.

BIOSC 447, H447, 647 Plant Ecology Laboratory 2(1,2) Experimental and observational approach to addressing principles discussed in BIOSC 446. Students are introduced to field and laboratory methods involving individual organisms, populations, and communities. *Preq or Coreq:* BIOSC 446 or consent of instructor.

BIOSC 450, H450, 650 Developmental Biology Laboratory 2(1,2) Examines a broad range of topics concerned with the development of multicellular animals such as gametogenesis, fertilization, embryonic development, cell differentiation, morphogenesis, larval metamorphosis, and regeneration. Laboratory exercises provide the rationale and methods for the descriptive and experimental analysis of development in representative invertebrates and vertebrates. *Preq or Coreq:* BIOSC 440 or equivalent.

BIOSC 452, 652 Plant Anatomy and Morphology 3(3,0) Studies of the anatomy, reproduction, and phylogenetic relationships of vascular plants. *Prq:* BIOL 104, 111 or BIOSC 205, or consent of instructor.

BIOSC 453, 653 Plant Anatomy and Morphology Laboratory 2(1,2) Laboratory focusing on the anatomy, reproduction, and phylogenetic relationships of vascular plants. *Coreq:* BIOSC 452.

BIOSC 456, H456, 656 Medical and Veterinary Parasitology 3(3,0) Introduction to parasitism in the animal kingdom with emphasis on both basic and applied principles as they relate to economically and medically important diseases. Classical and experimental approaches to the study of parasitism are examined in reference to protozoa, helminths, and arthropods. *Prq:* BIOL 104 or 111. *Coreq:* BIOSC 457.

BIOSC 457, H457, 657 Medical and Veterinary Parasitology Laboratory 2(1,2) Laboratory exercises reinforce material presented in BIOSC 456 and introduce students to both live and preserved human/animal parasites. Students are also introduced to techniques used in collection, preservation, and examination of animal parasites. *Coreq:* BIOSC 456.

BIOSC 458, H458, 658 Cell Physiology 3(3,0) Study of the chemical and physical principles of cell function emphasizing bioenergetics and membrane phenomena. *Prq:* BIOCH 210 or 301 or consent of instructor.

BIOSC 459, H459, 659 Systems Physiology 3(3,0) Physiological systems of vertebrates and their homeostatic controls. Function of the major physiological systems is described in terms of anatomical structure and chemical and physical principles. *Prq:* One year each of biology, chemistry, and physics or consent of instructor.

BIOSC 460, H460, 660 Systems Physiology Laboratory 2(1,2) Modern and classical experimental methods are used to demonstrate fundamental physiological principles discussed in BIOSC 459. Students are introduced to computer-aided data acquisition and computer simulations of physiological function. *Prq or Coreq:* BIOSC 459.

BIOSC 461, H461, 661 Cell Biology 3(3,0) In-depth analysis of how and where intracellular and extracellular molecules control general and specific cellular functions such as gene expression, secretion, motility, signaling, cell-cycle control and differentiation. Taught and graded at a level where students are expected to infer from and integrate cellular events. *Prq:* BIOCH 301 or consent of instructor.

BIOSC 462, 662 Cell Biology Laboratory 2(1,2) Accompanies BIOSC 461. Focus on molecular and microscopic analysis of eukaryotic cells. *Coreq:* BIOSC 461.

BIOSC 464, 664 Mammalogy 3(2,3) Origin, evolution, distribution, structure, and function of mammals, with laboratory emphasis on the mammals of South Carolina. Field collection required. *Prq:* BIOSC 303 or consent of instructor.

BIOSC (HORT) 465, 665 Plant Molecular Biology 3(3,0) Study of fundamental plant processes at both the cellular and molecular levels. Topics include genome structure and organization (both nuclear and organellar); regulation of gene

expression and its role in cellular and whole-plant processes; transposable genetic elements; applications for biotechnology. *Prq:* Junior standing or consent of instructor; BIOSC 304 or 305 and GEN 302.

BIOSC 468, 668 Herpetology 3(2,3) Systematics, life history, distribution, ecology, and current literature of amphibians and reptiles. Laboratory study of morphology and identification of world families, and U.S. genera, as well as all southeastern species. Field trips will be required. *Prq:* BIOSC 303 or consent of instructor.

BIOSC 470, H470, 670 Animal Behavior 3(3,0) Historical and modern developments in animal behavior emphasizing the evolutionary and ecological determinants of behavior. A synthesis of ethology and comparative psychology. *Prq:* BIOSC 302 or 303 or consent of instructor.

BIOSC 471, 671 Animal Behavior Laboratory 1(0,3) Laboratory exercises that explore the behavior of animals. Emphasis is on behavioral observation and analysis and presentation of findings in a report format. *Prq or Coreq:* BIOSC 470 or consent of instructor.

BIOSC 472, 672 Ornithology 4(3,3) Biology of birds: their origin and diversification, adaptations, phylogeny, classification, structure and function, behavior, ecology, and biogeography. Field identification is emphasized, and field trips are required. *Prq:* BIOSC 303 or consent of instructor.

BIOSC 475, H475, 675 Comparative Physiology 3(3,0) Physiological systems of invertebrates and vertebrates with emphasis on environmental adaptation. Physiological principles as they relate to metabolism, thermoregulation, osmoregulation, respiration, and neural and integrative physiology. *Prq:* One year each of biology, chemistry, and physics or consent of instructor.

BIOSC 476, H476, 676 Comparative Physiology Laboratory 2(1,2) Modern classical experimental methods are used to demonstrate fundamental physiological principles discussed in BIOSC 475. Students are introduced to computer-aided data acquisition and manipulation as well as computer simulations of physiological function. *Prq or Coreq:* BIOSC 475.

BIOSC 477, 677 Ichthyology 3(2,3) Systematics, life history, distribution, ecology, and current literature of fish. Laboratory study of morphology and identification of U.S. genera, as well as all southeastern species. Field trips will be required. *Prq:* BIOSC 303 or consent of instructor.

BIOSC 480, 680 Vertebrate Endocrinology 3(3,0) Introduction to the basic principles of neuro-endocrine integration and homeostatic maintenance in vertebrates. Comparative morphology and physiology of various endocrine tissues and hormone chemistry and modes of action are considered. *Prq:* BIOSC 303, organic chemistry, or consent of instructor.

BIOSC 486 Natural History 3(3,0) Interdisciplinary examination, through readings and critical discussion, of concepts of nature and biodiversity in relation to human endeavors. Course seeks to achieve a balanced perspective from which to seek compromises between conflicting views of nature. *Prq:* BIOSC 441, 443, or 446, or equivalent, or consent of instructor.

BIOSC 491, H491 Special Problems in Biological Sciences 2-4(0,6-12) Research problems in selected areas of biological sciences to provide an introduction to research planning and techniques. May be taken for a maximum of eight credits. *Prq:* Junior or Senior standing or consent of instructor.

BIOSC 493 Senior Seminar 2(2,0) Analysis and discussion of papers from the primary literature of the biological sciences. Students will search the primary literature, present and analyze selected readings. *Prq:* Senior standing and either ENGL 314 or SPCH 250 or consent of instructor.

BIOLOGY

Professors: J. L. Dickey, D. R. Helms, R. J. Kosinski, W. M. Surver, *Chair*; *Associate Professors:* R. A. Garcia, C. K. Revis-Wagner, A. D. Smith, J. A. Waldvogel; *Assistant Professor:* M. V. Ruppert; *Lecturers:* J. R. Cummings, V. C. Minor

BIOL 101 Concepts in Biology 1 4(3,3) First in a two-semester general education sequence covering fundamental biological concepts. Emphasizes the process of scientific inquiry applied to evolution, cell structure and function, genetics, and metabolism. Develops biological literacy by applying concepts to important issues in everyday life. Not open to students who have received credit for BIOL 110/111 or BIOL 103/104.

BIOL 102 Concepts in Biology II 4(3,3) Continuation of BIOL 101, emphasizing the process of scientific inquiry applied to biodiversity, animal and plant structure and function, ecology, and human impact on the environment. Develops practical biological literacy by applying concepts to important issues in everyday life. Not open to students who have received credit for BIOL 110/111 or BIOL 103/104. *Prq:* BIOL 101.

BIOL 103, H103 General Biology I 4(3,3)¹ First in a two-semester sequence on the fundamentals of biology. Lecture and laboratory emphasize the structural, molecular, and energetic basis of cellular activities, fundamentals of genetic variability, reproductive strategies of organisms, and scientific processes. Diversity of animals and principles of evolution are introduced.

BIOL 104, H104 General Biology II 4(3,3)¹ Continuation of BIOL 103, emphasizing animals and plants as functional units, evolution and diversity of plants, and principles of evolution and ecology. *Prq:* BIOL 103.

BIOL 109 Introduction to Life Science 4(3,3) Survey of topics in botany, zoology, microbiology, and ecology emphasizing comprehension and practical application of life-science concepts to experiments and activities appropriate for the elementary school classroom. Enrollment preference given to Early Childhood and Elementary Education majors.

BIOL 110 Principles of Biology I 5(4,3)¹ Introductory course designed for students majoring in biological disciplines. Integrates lecture and laboratory and emphasizes a modern, quantitative, and experimental approach to explanations of structure, composition, dynamics, interactions, and evolution of cells and organisms. High school chemistry is recommended. *Coreq:* CH 101.

BIOL 111 Principles of Biology II 5(4,3)¹ Continuation of BIOL 110 that emphasizes the study of plants and animals as functional organisms and the principles of ecology. *Prq:* BIOL 110.

¹Credit toward a degree will be given for only one combination of the following: BIOL 110 or 103 followed by BIOL 111 or 104 dependent on the requirements for the major.

BIOSYSTEMS ENGINEERING

Professors: W. H. Allen, D. E. Brune, J. A. Collier, Y. J. Han, J. C. Hayes, *Chair:* D. E. Linville, R. E. Williamson, *Associate Professor:* R. B. Dodd; *Instructor:* T. R. Garrett; *Lecturer:* R. G. Hammond

B E 214 Fabrication and Manufacturing Methods 2(1,3) Introduction to machine and structure fabrication for biosystems. Topics include metallurgy, arc and gas welding, fasteners, plastics, and protective coatings. *Prq:* E M 201. *Coreq:* E G 209.

B E 221 Surveying for Soil and Water Resources 2(1,3) Fundamentals of land measurement and traverse computations. Surveying practice in traverse and topographic surveys preliminary to design of techniques and construction of structures for resource management. *Prq:* MTHSC 106.

B E 322 Small Watershed Hydrology and Sedimentology 3(3,0) [W.1] Fundamental relationships governing rainfall disposition are used as bases for defining the hydrology of watersheds. Application of modeling techniques appropriate for runoff and sediment control is emphasized. *Prq:* PHYS 122. *Coreq:* CSENV 202.

B E 333 Environmental Modification 2(2,0) Principles of environmental modification and control including energy exchange, psychrometrics, heat and moisture balance, biological interactions, control systems, and basic elements of heating, ventilation, and air conditioning are presented. *Prq:* PHYS 221 or consent of instructor.

B E 350, H350 Microcomputer Controls in Biosystems 2(1,3) Microcomputer interfacing and digital control are studied for application to agriculture, aquaculture, biotechnology, and other biosystems. Topics include digital electronic circuits and components, microcomputer architecture and interfacing. *Prq:* MTHSC 208, E C E 307.

B E 357 Machine Unit Operations 2(2,0) Unit operations of machines useful to biosystems engineers are studied from a functional and applications approach. Machine cost analysis is included. *Prq:* B E 214 and E M 201 or consent of instructor.

B E 362, H362 Energy Conversion for Biosystems 3(2,3) Topics include energy requirements of biosystems, direct energy conversion methods, characteristics of energy sources, and economics. Energy conversions methods used in biosystems and their limitations are presented. *Prq:* M E 310.

B E 364 Non-Point Source Pollution Management and Control 3(2,3) Fundamentals of environmental engineering are presented. Includes quantification of environmental impact and ecosystem management related to non-point source environmental contaminants and nutrients, and planning and design of waste management systems. *Prq:* One year of chemistry, junior standing or consent of instructor.

B E 370 Practicum 1-3 Preplanned internship with an approved employer involved with biosystems engineering endeavors. A minimum 280 hours of supervised responsibility required per credit hour. Evaluation based on activity journal, written/oral report, and a letter from the supervisor. May be repeated for a maximum of three credits. To be taken Pass/Fail only. *Prq:* Junior standing and departmental permission.

B E (CSENV) 408, 608 Land Treatment of Wastewater and Sludges 3(3,0) See CSENV 408.

B E 416, H416, 616 Mechanical Design for Agricultural and Biological Systems 3(2,3) Fundamentals of mechanical design with applications to machinery functions relating to soil, plants, and biological products. A design project is performed. *Prq:* E M 304.

B E 421 Engineering Systems for Soil Water Management 2(1,3) Fundamentals of design related to drainage of lands, irrigation, and modification of the microenvironment for optimum productivity are presented. *Prq:* MTHSC 208. *Coreq:* C E 341.

B E (CH E) 428, 628 Biochemical Engineering 3(3,0) See CH E 428.

B E 429 Applications in Biotechnology Engineering 3(2,3) Biological growth kinetics and reactor kinetics are applied to demonstrate the principles of ethanol production, cellulose conversion, and anaerobic processes. Integration of food production processes and waste treatment fundamentals of modeling biological processes are studied. Specific biotechnical applications such as plant tissue culture, advances in biosensor and biomechanical systems are analyzed. *Prq:* CH E (B E) 428.

B E (BIOSC) 430, 630 Engineering Modeling of Biological Systems 3(3,0) Examination of the principal mechanisms of energy capture and transformation in living organisms. Quantitative models of energetic reactions and associated transport processes are developed according to the principles of equilibrium and nonequilibrium thermodynamics. Topics include basic cell biology, photosynthesis, respiration, chemosmotic theory, electron transport, mass and energy transport phenomena. *Prq:* BIOCH 301, MTHSC 208 or consent of instructor. *Coreq:* M E 310 or instruction in thermodynamics.

B E 431, 631 Structural Design for Biosystems 2(2,0) Analysis and design of structures and statically determinate components with emphasis on wood. *Prq:* E M 304 or C E 200.

B E 442, 642 Properties and Processing of Biological Products 3(2,3) Study of engineering properties of biological materials and their uniqueness as design restraints on systems for handling, processing and preserving biological products. *Prq:* B E 333, E M 304, 320, M E 310.

B E 450, H450, 650 Instrumentation for Biosystems Engineers 3(2,3) [C.1] Overview of modern instrumentation techniques for biosystems. Laboratory use of equipment is emphasized. Topics include performance characteristics of instruments, analog-signal conditioning, transducer theory and applications, and digital systems for data acquisition and control. *Prq:* B E 350, familiarity with computer programming, or consent of instructor.

B E (EE&S, FOR) 451, H451, 651 Newman Seminar and Lecture Series in Natural Resources Engineering 1(0,2) Topics dealing with the development and protection of land, air, water, and related resources are covered by seminar with instructor and by invited lecturers. Current environmental and/or resource conservation issues are addressed. *Prq:* Senior or Graduate standing, consent of instructor.

B E 471 Engineering Research and Management 2(1,3) [W.1] Research project is conducted on a biosystems engineering problem. Engineering economics, engineering creativity, and project management are incorporated in addition to communications skills. *Prq:* Senior standing in Biosystems Engineering or other engineering curricula.

B E 473 Special Topics in Biosystems Engineering 1-3(1-3,0) Comprehensive study of special topics in biosystems engineering not covered in other courses. Emphasis is on independent pursuit of detailed investigations. May be repeated for a maximum of six credits, but only if different topics are covered. *Prq:* Senior standing and departmental permission.

B E (EE&S, I E) 484, 684 Municipal Solid Waste Management 3(3,0) See EE&S 484.

BUSINESS

BUS 101 Business Foundations 1(1,0) Overview of the business environment. Topics include the economic and legal foundations of business and an introduction to the human resources, marketing, operations, and financial functions of global businesses. To be taken Pass/Fail only.

CALHOUN HONORS SEMINAR

The following courses may be taken to satisfy Accreditation Board for Engineering and Technology (ABET) requirements for depth in humanities and social sciences by pairing or sequencing with humanities or social science subject areas as designated in the syllabus for each Calhoun Honors Seminar course offering.

C H S H201 Structures and Society 3(3,0) Interdisciplinary honors seminar that examines selected structures regarded as monuments to artistic creativity and technological genius and the ways that structures affect and are affected by the societies that produce them. *Prq:* Membership in Calhoun College Honors Program.

C H S H202 Science, Culture, and Human Values 3(3,0) Interdisciplinary honors seminar that unifies natural scientific, social scientific, and humanistic disciplines into a holistic view of the modern world and its future. May be repeated for a maximum of six credits, but only if different topics are covered. *Prq:* Membership in Calhoun College Honors Program.

C H S H203 Society, Art, and Humanities 3(3,0) Combines readings and methodologies from the social sciences, arts, and humanities to study the interrelationships among the disciplines and their societal effects. Subjects vary. May be repeated for a maximum of six credits, but only if different topics are covered. *Prq:* Membership in Calhoun College Honors Program.

C H S H204 Honors Study/Travel 1(0,3) Study/travel experience related to a three credit Calhoun Honors Seminar. May be repeated for a maximum of three credits, but only if different topics are covered. *Preq:* Membership in Calhoun College Honors Program.

C H S H205 Methods of Interpretation 1(1,0) Seminar to teach students how to interpret documents, works of art, structures, and scholarly materials related to a three credit Calhoun Honors Seminar. May be repeated for a maximum of three credits, but only if different topics are covered. *Preq:* Membership in Calhoun College Honors Program.

CERAMIC AND MATERIALS ENGINEERING

Professors: D. A. Brosnan, D. R. Dinger, G. Lewis, I. J. Rack; *Associate Professors:* B. I. Lee, H. D. Leigh III, Chair; E. C. Skaar, T. D. Taylor; *Assistant Professors:* J. M. Ballato, R. W. Schwartz

C M E 201 Introduction to Ceramic Engineering 3(3,0) Introduction to the history of the industrial segments of the ceramic industry. Classification of the industry based on product lines and raw materials used. Examination of crystal chemistry, occurrence, winning, and preparation of raw materials prior to processing into ware. *Preq:* CH 101.

C M E 202 Processing Ceramic Raw Materials into Products 3(3,0) Study of the manufacturing of ceramic products from the point of view of clay-silicate raw materials characterization and preparation, mixing for quality, the characteristics of mixtures throughout the manufacturing sequences, and the study of forming procedures to obtain quality products. *Preq:* CH 101.

C M E 204 Laboratory Procedures 3(1,4) Introduction to ceramic laboratory procedures. Use of basic ceramic engineering machinery, testing equipment, and processes, e.g., dry pressing, slip casting, plaster-mold making, firing, glazing, and mechanical properties measurements. *Preq:* CH 101, MTHSC 106. *Coreq:* CH 102, MTHSC 108.

C M E 205 Introduction to Ceramic Engineering Calculations 3(2,2) Provides ceramic engineering students with basic tools and skills to use electronic spreadsheets to solve calculations-intensive engineering problems in processing or testing. Spreadsheet templates and reports are prepared on word processing software exchanged via e-mail.

C M E 210 Introduction to Materials Science 3(3,0) Beginning course in materials science designed primarily for engineering students. Study of the relation between the electrical, mechanical, and thermal properties of products and the structure and composition of these products. All levels of structure are considered from gross structures easily visible to the eye through electronic structure of atoms. *Preq:* CH 101, MTHSC 106.

C M E H300 Honors Seminar 1(1,0) Acquaints students enrolled in the Ceramic Engineering Departmental Honors Program with current research issues in the profession. This assists students in preparing a research proposal for the Senior Thesis. To be taken Pass/Fail only. *Preq:* Admission to departmental honors program and Junior standing.

C M E 302 Thermo-Chemical Ceramics 3(3,0) High-temperature equilibrium using the laws of physical chemistry as applied to ceramic systems in both solid and liquid states. An introduction to the crystal chemistry of ceramic raw materials, and the effect of crystalline form on their high-temperature behavior.

C M E 304 Experimental Design 3(1,4) [C.1] Junior-level laboratory course designed to expose the student to statistically-designed experimental techniques to solve ceramic engineering problems typically encountered in processing, testing, and manufacturing ceramic materials. *Preq:* C M E 201, 202, 204.

C M E 307 Thermal Processing of Ceramics 2(2,0) Accomplishment of changes in structure and composition through the application of thermal energy. Includes a study of simultaneous transfer of heat and mass, fluid flow, determinants of rates in a variety of reactions, and calculations of the energy requirements to accomplish change in structure or composition. *Coreq:* C M E 308.

C M E 308 Thermal Processing of Ceramics Laboratory 1(0,2) Laboratory experimentation to accomplish changes in structure and composition through the application of thermal energy. *Coreq:* C M E 307.

C M E 309 Research Methods 2(0,6) Planning and solution of selected research problems. *Preq:* C M E 304.

C M E 311 Kinetics of Materials Processes 3(3,0) Study of the kinetics of solid-solid, solid-liquid, and solid-gaseous reaction as they apply to materials system, energy transport as applied to materials processing and the importance of these phenomena to manufacturing and design of materials. *Preq:* CH 331.

C M E 317 Industrial Fuels and Combustion 2(2,0) Study of the application of burners, fuels, and control equipment to industrial kilns and furnaces. Emphasis is on current industrial equipment and practices. Topics include fuel chemistry, combustion analysis, ratio-control systems, flow and pressure measurement and control, burners, flames and heat transfer. *Preq:* CH 102. *Coreq:* C M E 318.

C M E 318 Combustion Laboratory 1(0,2) Study of burner control equipment and control methodologies. Emphasis is on developing confidence in each student concerning the safe operation of industrial burners. Students learn about burner control equipment and techniques for adjusting air/fuel ratios and for controlling a variety of industrial burners. *Preq:* CH 102. *Coreq:* C M E 317.

C M E H395 Honors Research 1 3(0,9) Individual research under the direction of a ceramic engineering faculty member. *Preq:* C M E H300.

C M E 402, H402, 602 Solid State Ceramics 3(3,0) Effects of the composition, form, and source of raw materials on the manufacturing processes and final properties of ceramics. Included are fundamental studies of phenomena such as diffusion, sintering, phase transformation, stability, and microstructural development. Property measurement and analytical methods for characterization are discussed. *Preq:* C M E 302, 311, MTHSC 208.

C M E 403, H403, 603 Glasses 3(3,0) Glass structure and composition and their relation to the properties of glasses. Consideration is given to the processing variables which control the properties of glasses including glass products, enamels, glazes, and vitreous bonds.

C M E 404, 604 Ceramic Coatings 3(3,0) Raw materials, methods of manufacture, and properties of ceramic coating. *Preq:* C M E 302.

C M E 406 Ceramic Project 2(0,6) Completion of an original research into a ceramic problem. May be repeated for a maximum of four credits. *Preq:* C M E 302.

C M E H406 Honors Ceramic Project 1-2(0,3-6) Individual research under the direction of a Ceramic and Materials Engineering faculty member. *Preq:* C M E H300 and permission of departmental honors coordinator.

C M E 407 Senior Design Project 3(1,4) Gives students real ceramic engineering experience. Students participate with an industrial partner in the solution of design engineering problems. *Preq:* C M E 304 and Senior standing in Ceramic Engineering.

C M E 410, 610 Analytical Processes 3(2,3) Introductory course on the theory and use of X-ray diffraction and spectroscopic methods. *Preq:* Junior standing.

C M E 414, 614 Processing of Ceramics 3(3,0) Covers ceramic processing after the raw material preparation with emphasis on modern processing theories and practices. Topics include nature of particles, forming methods, characterization techniques, consolidation by heat, surface chemistry of solids, and chemical processing of specialized ceramics and composites. *Preq:* CH 102 or equivalent.

C M E 416, 616 Electronic Ceramics 3(3,0) Theory and measurement of the electronic properties of ceramic products.

C M E 418, 618 Process Control 3(3,0) Process control techniques and apparatus with particular emphasis on temperature measurement and control systems. Application of laboratory techniques to the control of product quality and process efficiency is included. *Preq:* Junior standing.

C M E 419, 619 Science of Engineering Materials 3(3,0) Acquaints engineers with thermal, electrical, and chemical characteristics of engineering materials. Emphasizes fundamental consideration of the structure of matter in the solid and glassy states, solid-state reactions, and influence of particle and aggregate structure to speed of reactions and product properties. *Preq:* CH 112, MTHSC 108, PHYS 122.

C M E 420, 620 Science of Engineering Materials 3(3,0) Continuation of C M E 419 with emphasis on application of fundamentals in nuclear reactors and nuclear power plants. Consideration is given to the development of ceramics for fuel elements, moderator materials, control rods, shielding and radioactive waste disposal.

C M E 430, 630 Fine Particle Processing in Ceramic Systems 3(3,0) Study of the cause-and-effect relationship in particulate suspensions controlling rheological behavior, porosity, packing densities, shrinkage, and other properties of ceramic ware. Subjects covered include particle size analysis techniques and measurements, particle packing, rheological properties and measurements, surface area analysis, and interfacial chemicals including both flocculants and deflocculants. *Preq:* C M E 202, 204, 304 or consent of instructor.

C M E 450 Safety and Environmental Concerns in Ceramic Manufacturing 3(3,0) Introductory course on safety and environmental regulations applied to ceramic manufacturing. Ceramic materials are examined with respect to potentially hazardous constituents. Effluents from ceramic manufacturing are examined. Current legislation, including application of the Clean Air Act, is reviewed. Recycling strategies with ceramic technology are examined. *Preq:* C M E 302, 307.

C M E 451 Brittle Material Design 3(2,2) Introduction to the mechanical properties of brittle materials and the use of Weibull statistics and finite element analysis to design with brittle materials. *Preq:* Junior standing.

C M E 460, 660 Metals and Their Composites 3(3,0) Examines the control of microstructure-property relationships in metallic materials and their composites through development and selection of appropriate thermal processing procedures. *Preq:* C M E 210 or ME 301.

C M E 461, 661 Processing of Metals and Their Composites 3(3,0) Examines the control of microstructure-property relationships in metallic materials and their composites through development and selection of innovative manufacturing methods. *Preq:* C M E 210 or ME 301.

C M E (BIO E) 480, 680 Research Principles and Concepts 1(1,0) See BIO E 480.

C M E 490, H490, 690 Special Topics in Ceramic Engineering 1-3(1-3,0) Study of topics not ordinarily covered by other courses. Taught as the need arises. Typical topics could include current research in a specific area or technological advances. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Consent of instructor.

C M E H495 Honors Research II 3(0,9) Individual research under the direction of a ceramic engineering faculty member. *Preq:* C M E H395 or three credits of C M E H406.

C M E H497 Honors Thesis 1(1,0) Preparation of honors thesis based on research conducted in C M E H395 and H495. *Preq:* C M E H495.

CHEMICAL ENGINEERING

Professors: C. H. Barron, Jr., D. D. Edie, C. H. Gooding, Chair; J. M. Haile, S. S. Melsheimer, A. A. Ogale, M. C. Thies; *Associate Professors:* D. E. Hirt, R. W. Rice; *Assistant Professors:* D. A. Bruce, S. M. Husson, S. M. Kilbey

CHE 211 Introduction to Chemical Engineering 4(3,2) Introduction to fundamental concepts of chemical engineering, including mass and energy balances, PVT relationships for gases and vapors, and elementary phase equilibria; problem-solving

and computer skills are developed in lab. *Preq:* CH 102; ENGR 120, PHYS 122.

CHE 220 Chemical Engineering Thermodynamics I 3(3,0) Topics include first and second laws of thermodynamics, ideal gases, PVT properties of real fluids, energy balances with chemical reactions, and thermodynamic properties of real fluids. *Preq:* CHE 211 and MTHSC 206.

CHE H300 Honors Seminar 1(1,0) Acquaints students enrolled in the Chemical Engineering Departmental Honors Program with current research issues in the profession. This will assist the student in preparing a research proposal for the Senior Thesis. To be taken Pass/Fail only. *Preq:* Admission to departmental honors program and Junior standing.

CHE 307 Unit Operations Laboratory I 3(2,3) [O.1] [W.1] Laboratory work in the unit operations of fluid flow, heat transfer, and evaporation. Stress is on the relation between theory and experimental results and the statistical interpretation of those results and on report preparation and presentation. *Preq:* CHE 311, E G 209. *Coreq:* EX ST 411 or MTHSC 302.

CHE 311 Fluid Flow 3(3,0) Fundamentals of fluid flow and the application of theory to chemical engineering unit operations, such as pumps, compressors, and fluidization. *Preq:* CHE 211, MTHSC 206.

CHE 312 Heat and Mass Transfer 3(3,0) Study of the basics of heat transmission and mass transport. Special emphasis is placed on theory and its application to design. *Preq:* CHE 220, 311.

CHE 319 Engineering Materials 3(3,0) Introduction to the fundamental properties and behavior of engineering materials, with emphasis on polymers, metals, ceramics, and composite materials. *Preq:* CHE 211. *Coreq:* CH 223 and CHE 220.

CHE 321 Chemical Engineering Thermodynamics II 3(3,0) Continuation of CHE 220. Topics include thermodynamics of power cycles and refrigeration/liquefaction, thermodynamic properties of homogeneous mixtures, phase equilibria, and chemical reaction equilibria. *Preq:* CHE 220 and MTHSC 208.

CHE 353 Process Dynamics and Control 3(3,0) Mathematical analysis of the dynamic response of process systems. Basic automatic control theory and design of control systems for process applications. *Preq:* CHE 311 and MTHSC 208.

CHE H395 Honors Research I 3(0,9) Individual research under the direction of a chemical engineering faculty member. *Preq:* CHE H300 or permission of department honors coordinator.

CHE 401, 601 Transport Phenomena 3(3,0S) Mathematical analysis of single and multi-dimensional steady-state and transient problems in momentum, energy, and mass transfer. Both the similarities and differences in these mechanisms are stressed. *Preq:* CHE 312 and MTHSC 208.

CHE 407 Unit Operations Laboratory II 3(1,6) [O.1] [W.1] Continuation of CHE 306 with experiments primarily on the diffusional operations. Additional lecture material on report writing and general techniques for experimental measurements and analysis of data, including statistical design of experiments. *Preq:* CHE 307, 312, 353.

CHE 412, 612 Polymer Engineering 3(3,0) Design-oriented course in synthetic polymers. Topics include reactor design used in polymer production, effect of step versus addition kinetics on reactor design, epoxy curing reactions, polymer solubility, influence of polymerization and processing conditions on polymer crystallinity. *Preq:* CH 224 and 332 or consent of instructor.

CHE 413 Separation Processes 3(3,0) Study of gas-liquid and liquid-liquid separation techniques with emphasis on gas absorption, distillation, and liquid-liquid extraction. *Preq:* CH 332, CHE 312, 321.

CHE (B E) 428, 628 Biochemical Engineering 3(3,0) Use of microorganisms and enzymes for the production of chemical feedstocks, single-cell protein, antibiotics, and other fermentation products. Topics include kinetics and energetics of microbial metabolism, design and analysis of reactors for microbial growth and enzyme-catalyzed reactions, and considerations of scale-up, mass transfer, and sterilization during reactor design. *Preq:* B E (BIOSC) 430, BIOCH 301, MICRO 305 (for Biosystems Engineering majors); *Coreq:* CHE 312, 450 (for Chemical Engineering majors).

CHE 431 Process Development, Design, and Optimization of Chemical Engineering Systems 13(2,3) Study of the steps in creating a chemical process design from the original concept to successful completion and operation of the plant. Topics include engineering economics, systems and analysis, simulation, optimization, process-equipment sizing, selection, and costing. *Preq:* CH 307, 312. *Coreq:* CHE 413.

CHE 432 Process Development, Design, and Optimization of Chemical Engineering Systems II 5(1,12) [O.1] [W.1] Continuation of CHE 431. The principles of process development, design, and optimization are applied in a comprehensive problem carried from a general statement of the problem to detailed design and economic evaluations. *Preq:* CHE 321, 353, 407, 413, and 450 or consent of department chair.

CHE 443 Chemical Engineering Senior Seminar I 1(1,0) Topics include oral communications, job interviewing skills, professionalism and professional ethics, and chemical engineering job functions in various industries. Oral presentations are given by students, and invited speakers from the profession discuss issues of current interest. To be taken Pass/Fail only. *Preq:* CHE 312. *Coreq:* CHE 431.

CHE 444 Chemical Engineering Senior Seminar II 1(1,0) [O.1] Continuation of CHE 443. To be taken Pass/Fail only. *Preq:* CHE 443. *Coreq:* CHE 432.

CHE 445 Selected Topics in Chemical Engineering 3(3,0) Topics not covered in other courses, emphasizing current literature, research, and practice of chemical engineering. Topics vary from year to year. May be repeated, but only if different topics are covered. *Preq:* Consent of instructor.

CHE 450, 650 Chemical Reaction Engineering 3(3,0) Review of kinetics of chemical reactions and an introduction to the analysis and design of chemical reactors. Topics include homogeneous and heterogeneous reactions, batch and continuous flow reaction systems, catalysis, and design of industrial reactors. *Preq:* CHE 312, 321, and CH 332.

CH E 454, 654 Computer Process Control 3(3,0) Introduction to digital computer control as applied in chemical process industries. Topics include dynamics of process systems, control computer hardware and software, sampled data mathematics, digital control algorithms, process identification, and advanced control techniques. *Preq:* CH E 353 or equivalent and E C E 307, MTHSC 208.

CH E 491, H491 Special Projects in Chemical Engineering 1-3(1-3,0) As a need arises, special topics requested by students or offered by the faculty are taught. Review of current research in an area, technological advances, and national engineering goals are possible topic areas. May be repeated for a maximum of six credits, but only if different topics are covered.

CH E H495 Honors Research II 3(0,9) Individual research under the direction of a chemical engineering faculty member. *Preq:* CH E H395.

CH E H497 Honors Thesis 1(1,0) Preparation of honors thesis based on research conducted in CH E H395 and H495. *Preq:* CH E H495.

CHEMISTRY

Professors: R. A. Abramovitch, A. L. Beyerlein, Chair, M. M. Cooper, D. D. DesMarreau, R. K. Dieter, I. D. Eubanks, J. W. Huffman, J. W. Kolis, R. K. Marcus, H. G. Spencer; *Associate Professors:* J. R. Appling, S. E. Creager, S.-J. Hwu, A. L. Kholodenko, W. T. Pennington, Y.-P. Sun; *Assistant Professors:* D. Perahia, D. W. Smith, Jr., S. J. Stuart; *Lecturers:* K. A. Creager, D. J. Crockett, L. T. Eubanks, A. Kitaygorodskiy, M. B. Martin, G. L. Shimek; *Visiting Assistant Professors:* C. W. Bowen, M. L. Doerr; *Visiting Instructor:* E. L. Case

CH 101, H101 General Chemistry 4(3,3) Introduction to the elementary concepts of chemistry through classroom and laboratory experience. Emphasizes chemical reactions and the use of symbolic representation, the mole concept and its applications and molecular structure. *Preq/Coreq:* MTHSC 105 or higher placement in MTHSC.

CH 102, H102 General Chemistry 4(3,3)¹ Continuation of CH 101, treating solutions, rates of reactions, chemical equilibrium, electrochemistry, chemistry of selected elements, and an introduction to organic chemistry. For students taking one year of chemistry or continuing in CH 201. *Preq:* C or better in CH 101.

CH 105 Beginning General and Organic Chemistry 4(3,3) Elementary treatment of principles of general and organic chemistry for students in liberal arts, education, business, health science, and selected life-science curricula. Laboratory is coordinated with lecture. (Credit toward a degree given for only one of CH 101 and 105.) *Preq:* May not be taken as a prerequisite for organic chemistry.

CH 106 Beginning General and Organic Chemistry 4(3,3)¹ Continuation of CH 105. Topics in elementary organic chemistry with an emphasis on organic chemistry relevant to life processes are developed in both lecture and laboratory. (Credit towards a degree will be given for only one of the following: CH 106 or 102.) May not be taken as a prerequisite for organic chemistry. *Preq:* C or better in CH 105, or consent of instructor.

CH 141 Chemistry Orientation 1(1,0) Lectures, discussions, and demonstrations devoted to health and safety in the chemistry laboratories; use of the chemical literature; and career planning. *Preq:* Registration in CH 101.

CH 201 Survey of Organic Chemistry 4(3,3)² Introduction to organic chemistry emphasizing nomenclature, classes of organic compounds, chemistry of functional groups. For students needing a one-semester course in organic chemistry. *Preq:* CH 102 or consent of instructor.

CH 205 Introduction to Inorganic Chemistry 2(2,0) One semester treatment which emphasizes the properties and reactions of the more common chemical elements. *Preq/Coreq:* CH 102.

CH 206 Inorganic Chemistry Laboratory 1(0,3) Introduction to laboratory synthesis and characterization of inorganic compounds. Laboratory sessions consist of a set of six landmark inorganic experiments for which the original authors have been awarded Nobel prizes. *Coreq:* CH 102, 205.

CH 223 Organic Chemistry 3(3,0)³ Introductory course covering the principles of organic chemistry and the derivation of these principles from a study of the properties, preparations, and interrelationships of the important classes of organic compounds. *Preq:* CH 102 or consent of instructor.

CH 224 Organic Chemistry 3(3,0) Continuation of CH 223. *Preq:* CH 223.

CH 225 Organic Chemistry Laboratory 2(0,6)³ Laboratory techniques involved in the synthesis, separation and purification, and characterization of typical examples of the classes of organic compounds. *Preq:* Registration in CH 223.

CH 226 Organic Chemistry Laboratory 2(0,6)⁴ Continuation of CH 225. *Preq:* Registration in CH 224.

CH 227 Organic Chemistry Laboratory 1(0,3)³ Synthesis and properties of typical examples of the classes of organic compounds. *Preq:* Registration in CH 223.

CH 228 Organic Chemistry Laboratory 1(0,3)⁴ Continuation of CH 227. *Preq:* CH 227 and registration in CH 224.

CH 229 Organic Chemistry Laboratory 1(0,3)³ One-semester laboratory for chemical engineering students. *Preq:* CH 223.

CH 313 Quantitative Analysis 3(3,0) Fundamental principles of volumetric, gravimetric, and certain elementary instrumental chemical analyses. *Preq:* Concurrent enrollment for credit in CH 315 or 317.

CH 315 Quantitative Analysis Laboratory 2(0,6)⁵ Laboratory techniques of volumetric, gravimetric, and elementary instrumental chemical analyses. *Coreq:* Concurrent enrollment for credit in CH 313.

CH 317 Quantitative Analysis Laboratory 1(0,3)⁵ Standard techniques of analytical chemistry—gravimetric, volumetric, and instrumental. *Coreq:* Concurrent enrollment for credit in CH 313.

CH 330 Introduction to Physical Chemistry 3(3,0)⁶ One-semester treatment of physical chemistry which emphasizes topics that are especially useful in the life sciences, agriculture, and medicine: chemical thermodynamics, equilibrium, so-

lutions, kinetics, electrochemistry, macromolecules, and surface phenomena. *Preq:* MTHSC 106.

CH 331 Physical Chemistry 3(3,0)⁶ Includes the gaseous state, thermodynamics, chemical equilibria, and atomic and molecular structure, from both experimental and theoretical points of view. *Preq:* MTHSC 206, PHYS 221.

CH 332, H332 Physical Chemistry 3(3,0) Continuation of CH 331, including chemical kinetics, liquid and solid state, phase equilibria, solutions, electrochemistry and surfaces. *Preq:* CH 331 or consent of instructor.

CH 339 Physical Chemistry Laboratory 1(0,3) Experiments are selected to be of maximum value to Chemistry and Chemical Engineering majors. *Coreq:* CH 331 or CH E 220.

CH 340 Physical Chemistry Laboratory 1(0,3) Continuation of CH 339. *Preq:* Registration in CH 332.

CH 402, H402, 602 Inorganic Chemistry 3(3,0) Basic principles of inorganic chemistry are discussed with special emphasis on atomic structure, chemical bonding, solid state, coordination chemistry, organometallic chemistry, and acid-base theories. The chemistry of certain selected elements is treated. *Preq:* CH 331, 332.

CH 411 Instrumental Analysis 3(3,0) Principles of operation and application of modern chemical instrumentation in the field of analytical chemistry. Topics include basic electronics, statistics, optical, mass, magnetic resonance, electron and x-ray spectroscopies, radiochemistry, and separation science. *Preq:* CH 331, 332.

CH 412 Instrumental Analysis Laboratory 2(0,5) Reinforcement of principles of chemical instrumentation described in CH 411 by practical, hands-on experience. Aspects of sample preparation, standardization, data acquisition and interpretation, and report formulation procedures common in chemical analyses are considered for a range of modern instrumental methods. *Coreq:* CH 411.

CH 413, H413 Chemistry of Aqueous Systems 3(3,0) Chemical equilibria in aqueous systems, especially natural waters; acids and bases, dissolved CO_2 , precipitation and dissolution, oxidation-reduction, adsorption, etc. *Preq:* CH 102 or 106.

CH 421, H421, 621 Advanced Organic Chemistry 3(3,0) Survey of modern organic chemistry with an emphasis on synthesis and mechanisms. *Preq:* CH 224, 332, or equivalent.

CH 425, 625 Medicinal Chemistry 3(3,0) Survey of the pharmaceutical drug discovery process. Covers discovery of candidate compounds, bioassay methods, and associated regulatory and commercial issues. Case studies are selected from the current literature. *Preq:* CH 224 or equivalent or permission of instructor.

CH 427, H427, 627 Organic Spectroscopy 3(2,3) Survey of modern spectroscopic techniques used in the determination of molecular structure. Emphasis is on the interpretation of spectra: nuclear magnetic resonance, ultraviolet, infrared, mass spectroscopy, optical rotatory dispersion and circular dichroism. *Preq:* One year each of organic chemistry and physical chemistry.

CH 435, 635 Atomic and Molecular Structure 3(3,0) Introduction to quantum theory and its application to atomic and molecular systems. Topics include harmonic oscillator, hydrogen atom, atomic and molecular orbital methods, vector model of the atom, atomic spectroscopy, and molecular spectroscopy. *Preq:* CH 332 or consent of instructor.

CH 443 Research Problems 3(0,9) Original investigation of an assigned problem in a fundamental branch of chemistry. Work must be carried out under the supervision of a member of the staff. *Preq:* Senior standing in Chemistry or consent of instructor.

CH 444 Research Problems 3(0,9) Continuation of CH 443.

¹Credit toward a degree will be given for only one of the following: CH 102 or 106.

²Credit toward a degree will be given for only one of the following: CH 201 or 223.

³Credit toward a degree will be given for only one of the following: CH 225, 227, or 229.

⁴Credit toward a degree will be given for only one of the following: CH 226 or 228.

⁵Credit toward a degree will be given for only one of the following: CH 315 or 317.

⁶Credit toward a degree will be given for only one of the following: CH 330 or 331.

CHINESE

CHIN 101 Elementary Chinese 4(3,1) Introductory course stressing speaking, listening, and writing. Attention is given to the sound system of Chinese to enable students to distinguish the four tones and to develop basic communication skills. Participation in cultural activities is encouraged.

CHIN 102 Elementary Chinese 4(3,1) Continuation of CHIN 101. *Preq:* CHIN 101 or consent of instructor.

CHIN 201 Intermediate Chinese 3(3,0) Intermediate course with more emphasis on communication skills and structure. Reading and writing practice without phonetic aids; oral practice in and outside the class, paying special attention to idiomatic usage; introduction to cultural perspectives through readings and cultural activities. *Preq:* CHIN 102 or consent of instructor.

CHIN 202 Intermediate Chinese 3(3,0) Continuation of CHIN 201. *Preq:* CHIN 201 or consent of instructor.

CIVIL ENGINEERING

Professors: S. C. Anand, N. M. Aziz, L. C. Bell, R. H. Brown, Chair; J. L. Burati, J. E. Clark, C. H. Huang, J. K. Nelson, R. F. Nowack, B. L. Sill, P. R. Sparks, *Associate Professors:* S. Amirkhanian, E. J. Hayter, T. A. Reinhold, D. V. Rosowsky, S. R. Sanders, S. D. Schiff, *Assistant Professors:* J. C. Horne, A. J. Patel, P. A. Work; *Lecturers:* L. O. Drew, W. F. Eskridge, J. A. Johnson

C E 200 Structural Mechanics 4(3,3) Builds on statics to develop relationships between external loads on structural elements of civil engineering interest and the resulting internal loads and deformations. Students are exposed to the development of stress and deformation formulas and the identification and use of significant mechanical properties of civil engineering materials. *Preq:* E M 201.

C E 250 Creative Problem Solving I 2(1,3) Methods used in defining problems, generating and selecting alternatives, evaluating solutions; historical creativity, free thinking and characteristics of effective problem solvers. *Preq:* ENGR 120 and sophomore standing.

C E 251 Analysis Techniques in Civil Engineering 3(2,3) [C.1] Solution to civil engineering problems using the techniques of dimensional analysis, data analysis and numerical analysis. The latter includes introduction to FORTRAN programming, simulation analysis, and the numerical solution of systems of linear algebraic equations. *Preq:* ENGR 120. *Coreq:* MTHSC 206.

C E 253 Civil Engineering Measurements 2(1,2) Principles and methods for measurement of loads, load effects, environmental variables, and performance of civil engineering systems. Classes integrate lectures and hands-on applications. Exercises provide students with an introduction to sensors, basic electrical circuits, data acquisition systems, and data analysis methods used in civil engineering. *Preq:* E G 209

C E 255 Geomatics 3(2,3) Spatial data collection methods including surveying, digital photogrammetry and remote sensing, and global positioning systems. Methods and technologies used to manage, manipulate, and analyze spatial and associated attribute data including geographic information systems.

C E 301 Structural Analysis 3(2,2) Calculation of design loads for buildings and other structures. Use of classical analysis techniques to determine support reactions, internal member forces, and structural displacements of statically determinate and indeterminate structural systems. *Preq:* C E 200 or permission of instructor.

C E 311 Transportation Engineering Planning and Design 3(3,0) Planning, design, and operation of transportation facilities including highways and airports. Coverage includes economic, safety, and environmental considerations. Public transit systems are covered. *Preq:* MTHSC 302 or EX ST 301 and C E 253.

C E 321 Geotechnical Engineering 4(3,3) Mechanical and physical properties of soils and their relation to soil action in problems of engineering, such as classification, permeability, shearing strength, and consolidation: design of embankments and retaining walls with geotextiles. *Preq:* C E 200.

C E 331 Construction Engineering and Management 3(3,0) Construction contracts, technical specifications, cost estimating, project scheduling, cost control, materials management, quality control, and quality assurance. *Preq:* Junior standing.

C E 341 Introduction to Fluid Mechanics 4(3,3) Introduction to fluid mechanics, including properties of static and dynamic situations. Problem-solving skills are emphasized, including the principles of mass, momentum, and energy conservation. Special topics include conduit flows and pump systems. Laboratory experiments are designed to familiarize students with laboratory techniques and instrumentation. *Preq:* E M 202 and Junior standing.

C E 342 Applied Hydraulics and Hydrology 3(3,0) Concepts covered are pipe network design, precipitation, evapotranspiration, runoff, hydrograph analysis, flood routing, hydrologic design, open channel flow, design of stable channels, and groundwater hydraulics. A design project involving hydrologic system analysis and design is assigned. *Preq:* C E 341.

C E 350 Economic Evaluation of Projects 3(3,0) [O.1] Comparison of design alternatives based on engineering economic analysis. Introduction of present worth, annual cost, rate of return, and benefit-cost ratio methods. Use of depreciation and taxation in project analysis. Students make oral presentations of historic and current civil engineering projects. *Preq:* Junior standing.

C E 351 Civil Engineering Materials 3(2,3) [O.1] Basic properties of aggregates, Portland cement, and asphalt cement. Classification of aggregates on the basis of size and strength. Properties of Portland cement and asphalt concrete mixtures, mix design procedures, field control and adjustments. Properties of steel and wood. Field trips to nearby plants. *Preq:* MTHSC 302 or EX ST 301. *Coreq:* C E 200.

C E 352 Economic Evaluation of Projects 2(2,0) Comparison of design alternatives based on engineering economic analysis. Introduction of present worth, annual cost, rate of return, and benefit-cost ratio methods. Use of depreciation and taxation in project analysis. *Preq:* Junior standing.

C E 353 Professional Seminar 1(1,0) Various professional topics related to skills and techniques for evaluating career opportunities, seeking and obtaining civil engineering employment, career development, professional registration, professional ethics, and other factors necessary for achieving success in a professional career. To enable students to make better decisions that will help them succeed in their careers. *Preq:* Junior standing.

C E H388 Honors Presentation Skills 1(0,2) Delivering and organizing effective presentations, use of presentation aids and graphics.

C E H389 Honors Research Skills 1(1,0) Research problem selection, research tools, research reports organization. *Preq:* C E H388.

C E 401 Indeterminate and Matrix Structural Analysis 3(3,0) Analysis of indeterminate structures using moment distribution, energy methods such as virtual work and Castigliano's Theorem, and the matrix formulation of the direct stiffness method. *Preq:* C E 301 or permission of instructor.

C E 402 Reinforced Concrete Design 3(3,0) Design of reinforced concrete beams, slabs, columns, and footings using ultimate strength design. An introduction to working stress design methods is included. *Preq:* C E 301 or permission of instructor.

C E 404, 604 Wood and Masonry Structural Design 3(3,0) Introduction to wood design and engineering; properties of wood and wood-based materials; design of beams, columns, walls, roofs, panel systems, and connections; fundamentals of masonry materials, construction and structural systems, lateral load-resisting shear walls, loadbearing walls, columns and pilasters, and connections. *Preq:* C E 402 or permission of instructor.

C E 405, 605 Structural Systems Design 3(3,0) Study of the structural design process including structural requirements, structural systems and ma-

materials, specification of loads, and the preliminary design and costing of structural components and systems. *Prq:* C E 301 or permission of instructor.

C E 406 Structural Steel Design 3(3,0) Introduction to the design of structural elements found in steel buildings, in particular the design of steel tension members, beams, columns, beam-columns, and connections. Additional topics include composite members and plate-girders. Emphasis is on the AISC-LRFD Specifications for steel design, though reference will be made to the ASD Specification with comparisons made where appropriate. *Prq:* C E 301 or permission of instructor.

C E 410, 610 Traffic Engineering: Operations 3(3,0) Basic characteristics of motor-vehicle traffic, highway capacity, applications of traffic control devices, traffic design of parking facilities, engineering studies, traffic safety, traffic laws and ordinances, public relations. *Prq:* C E 311.

C E 411, 611 Roadway Geometric Design 3(2,3) Geometric design of roadways, at-grade intersections, and interchanges in accordance with conditions imposed by driver ability, vehicle performance, safety, and economics. *Prq:* C E 410.

C E 412, 612 Urban Transportation Planning 3(3,0) Urban travel characteristics, characteristics of transportation systems, transportation and land-use studies, trip distribution and trip assignment models, city patterns and subdivision layout. *Prq:* C E 311.

C E 421, 621 Geotechnical Engineering Design 3(3,0) Relationship of local geology to soil formations, groundwater, planning of site investigation, sampling procedures, determination of design parameters, foundation design and settlement analysis. *Prq:* C E 321.

C E 433, 633 Construction Planning and Scheduling 3(3,0) Principles and applications of the Critical Path Method (CPM) and Project Evaluation and Review Techniques (PERT). Project breakdown and network graphics. Identification of the critical path and resulting floats. Definition and allocation of materials, equipment, and manpower resources. Resource leveling, compression, and other network adjustments. Computer applications using packaged routines. *Prq:* C E 331.

C E 434, 634 Construction Estimating and Project Control 3(3,0) Specifications, contracts, and bidding strategies; purchasing and subcontracting policies; accounting for materials, supplies, subcontracts, and labor; procedural details for estimating earthwork, reinforced concrete, steel, and masonry. Overhead and profit items. *Prq:* C E 324 or equivalent.

C E 438, 638 Construction Support Operations 3(3,0) Description of activities necessary for the completion of a construction job although not specifically recognized as direct construction activities. General conditions, safety, security, quality assurance, value engineering. Organizational support features and typical implementation procedures. *Prq:* C E 324 or equivalent and EX ST 301.

C E 439, 639 Construction Equipment Selection and Maintenance 3(3,0) Methodology of selecting the right equipment of the right size for each task of the construction job on the basis of power-train characteristics, crew size, terrain conditions,

and job requirements. Cycle time, cost, specifications, maintenance, replacement policy, monitoring. *Prq:* C E 331 or equivalent.

C E 446, 646 Flood Hazards and Protective Design 3(3,0) Study of flood hazards and methods of protective design of the built environment. Floodplain mapping and delineation. Methods for determining base flood elevations. Flood-resistant construction, flood proofing, and governmental regulations will be discussed. Includes case studies and design projects. *Coreq:* C E 342.

C E 447 Stormwater Management 3(3,0) Evaluation of peak discharges for urban and rural basins, design of highway drainage structures such as inlets and culverts; stormwater and receiving water quality; best management practices, detention, and retention ponds, and erosion and sediment control. *Prq:* C E 342; *Coreq:* EE&S 401 or permission of instructor.

C E 450 Creative Problem Solving II 2(1,3) Methods used in defining problems, generating and selecting alternatives, evaluating solutions; historical creativity, free thinking and characteristics of effective problem solvers. *Prq:* C E 250 and Senior standing.

C E 459 Capstone Design Project 3(1,6) [O.1] Students apply creativity with their engineering knowledge in the solution of open-ended civil engineering problems. Problems are formulated and solutions are evaluated by faculty and practicing engineers. Oral communication skills are developed through presentations, correspondence, and project reports. *Prq:* All required 300-level C E courses and the Technical Design Requirement.

C E 462, 662 Coastal Engineering I 3(3,0) Introduction to coastal and oceanographic engineering principles, including wave mechanics, wave-structure interaction, coastal water-level fluctuations, coastal-zone processes, and design considerations for coastal structures and beach nourishment project. *Prq:* C E 341 or E M 320.

C E 482, 682 Groundwater and Contaminant Transport 3(3,0) Basic principles of groundwater hydrology and transport of contaminants in groundwater systems; groundwater system characteristics; steady and transient flow; well hydraulics, design, and testing; contaminant sources, movement and transformations. *Prq:* E M 320. *Coreq:* EE&S 401.

C E H488 Honors Research I 3(3,0) Individual research under the direction of a Civil Engineering faculty member. *Prq:* C E H389.

C E H489 Honors Research II 3(3,0) Individual research under the direction of a Civil Engineering faculty member. *Prq:* C E H488.

C E 490, 690 Special Projects 1-3(1-3,0) Studies or laboratory investigations on special topics in the civil engineering field which are of interest to individual students and staff members. Arranged on a project basis with a maximum of individual student effort and a minimum of staff guidance. May be repeated for a maximum of three credits. *Prq:* Senior standing.

C E 491, 691 Selected Topics in Civil Engineering 1-6(1-6,0) Structured study of civil engineering topics not found in other courses. May be repeated for a maximum of six credits, but only if different topics are covered. *Prq:* Consent of instructor.

COACHING EDUCATION

C ED 349 Introduction to Coaching 3(3,0) Investigation into the scientific basis of the coaching profession. Topics include physiology, kinesiology, and psychology as well as administration of an athletic program.

C ED 350 Scientific Basis of Coaching I: Exercise Physiology 3(3,0) Increases understanding of basic scientific information concerning athletic performance by using the conceptual approach. In-depth investigation into the physiological principles that can enhance athletic performance is the primary focus. Phases of physical training as well as comprehensive evaluative techniques are included. *Prq:* C ED 349.

C ED 352 Scientific Basis of Coaching II: Kinesiology 3(3,0) Increases students' understanding of basic scientific information concerning athletic movement by utilizing the conceptual approach. Deals with the basic laws of human motion necessary in evaluation of athletic movement, utilizing joint structure and anatomic landmarks as a basis for motion. *Prq:* C ED 349.

C ED 353 Theory of Prevention and Treatment of Athletic Injuries 3(2,3) Increases students' understanding of principles involved in the prevention and treatment of athletic injuries. Deals with basic anatomy, first aid, and diagnostic techniques necessary for the understanding of basic athletic training procedures. *Prq:* C ED 349.

C ED 361 Administration and Organization of Athletic Programs 3(3,0) Study of modern techniques and practices used in administering athletic programs. Major emphasis areas such as practice and game organization, purchase and care of equipment, budget and finances, public relations, and legal liability in athletic programs are presented. *Prq:* C ED 349.

C ED 362 Psychology of Coaching 3(3,0) Study of psychological techniques utilized to promote maximum athletic performance. Areas of emphasis include motivation, coaching philosophy, athletic personality, mental preparation, and goal-oriented behavior. Not open to students who have taken C ED 342. *Prq:* C ED 349.

C ED 371 Coaching Baseball 1(0,3) Increases understanding of basic technical and practical information concerning the coaching of baseball by utilizing the conceptual approach. Students study basic principles of coaching, competitive organization, and proper technical skills needed to improve athletic performances. Total program development is also covered as it pertains to specific levels of competition. *Prq:* C ED 349.

C ED 372 Coaching Basketball 1(0,3) Increases understanding of basic technical and practical information concerning the coaching of basketball by utilizing the conceptual approach. Students study basic principles of coaching, competitive organization, and proper technical skills needed to improve athletic performances. Total program development is also covered as it pertains to specific levels of competition. *Prq:* C ED 349.

C ED 373 Coaching Cross Country 1(0,3) Increases understanding of technical and practical information concerning the coaching of cross country by utilizing the conceptual approach. Students study basic principles of coaching, competitive organization, and proper technical skills needed to improve athletic performances. Total program development is also covered as it pertains to specific levels of competition. *Preq:* C ED 349.

C ED 374 Coaching Football 1(0,3) Increases understanding of basic technical and practical information concerning the coaching of football by utilizing the conceptual approach. Students study basic principles of coaching, competitive organization, and proper technical skills needed to improve athletic performances. Total program development is also covered as it pertains to specific levels of competition. *Preq:* C ED 349.

C ED 375 Coaching Soccer 1(0,3) Increases understanding of basic technical and practical information concerning the coaching of soccer by utilizing the conceptual approach. Students study basic principles of coaching, competitive organization, and proper technical skills needed to improve athletic performances. Total program development is also covered as it pertains to specific levels of competition. *Preq:* C ED 349.

C ED 376 Coaching Strength and Conditioning 1(0,3) Increases understanding of basic technical and practical information concerning the coaching of strength and conditioning by utilizing the conceptual approach. Students study basic principles of coaching, training program, and equipment appraisal as a means to improve athletic performance. Total program development is also covered as it pertains to specific levels of competition. *Preq:* C ED 349.

C ED 377 Coaching Track and Field 1(0,3) Increases understanding of basic technical and practical information concerning the coaching of track and field by utilizing the conceptual approach. Students study basic principles of coaching, competitive organization, and proper technical skills needed to improve athletic performances. Total program development is also covered as it pertains to specific levels of competition. *Preq:* C ED 349.

C ED 453, 653 Athletic Injuries: Prevention, Assessment and Rehabilitation 3(3,0) Gives students an understanding of prevention, treatment, and rehabilitation procedures of injured athletes. *Preq:* C ED 349.

COMMUNITY AND RURAL DEVELOPMENT

(See courses listed under *Agricultural and Applied Economics*)
Professors: D. L. Barkley, G. L. Bradford, M. S. Henry, E. L. McLean, Assistant Professor: D. V. Rainey

C RD 357 Natural Resources Economics 3(3,0) Principles and problems involved in the use of soil, water, forest, and mineral resources, with special emphasis on economic aspects of alternative methods of resource utilization. *Preq:* AP EC 202, ECON 200 or 211.

C RD (APEC) 361 Introduction to Health-Care Economics 3(3,0) Introductory course in which students learn the basic economics of the institutions comprising the health-care industry. Topics include the underlying supply, demand, and institutional factors impacting health-care availability and cost of health care.

C RD (APEC) 411, 611 Regional Impact Analysis 3(3,0) Techniques for analysis of the growth and decline of regions including economic-base theory, shift share, regional input-output, regional econometric models, and fixed impact models. *Preq:* AP EC 202 or ECON 211 and 212.

C RD (AP EC) 412, 612 Spatial Competition and Rural Development 2(2,0) Development of rural economic activity in the context of historical, theoretical, and policy aspects of friction associated with spatial separation. Location factors, transfer costs, location patterns, and regional-growth policy are considered. *Preq:* AP EC 202 or ECON 211 or equivalent.

C RD (AP EC) 491 Internship, Agribusiness, and Community and Rural Development 1-6(0,2-12) Internship under faculty supervision in an approved agency or firm. Internships are designed to provide students with work experience in agribusiness or community and rural development. Students submit a comprehensive report within one week of the end of the internship. A maximum of six internship credits may be earned. *Preq:* Junior standing and/or consent of instructor.

COMPUTER ENGINEERING

(See Electrical and Computer Engineering)

COMPUTER SCIENCE

Professors: R. M. Geist III, S. M. Hedetniemi, S. T. Hedetniemi, E. W. Page III, J. C. Peck, A. J. Turner, Jr., J. M. Westall, Jr.; Associate Professors: H. C. Grossman, Acting Chair; D. P. Jacobs, J. D. McGregor, A. W. Madison, B. A. Malloy, R. P. Pargas, M. K. Smotherman, D. E. Stevenson; Assistant Professors: E. O. Hare, A. Kaplan, G. A. Tagliarini, Research Associate; Lecturers: K. J. Hay, C. F. Pellerin, H. A. Pellerin, D. J. Poling, D. J. Seager

CP SC 101, H101 Computer Science I 4(3,2) [C.3] Introduction to modern problem solving and programming methods. Special emphasis is placed on algorithm development and software life cycle concepts. Includes use of appropriate tools and discusses ethical issues arising from the impact of computing upon society. Intended for students concentrating in computer science or related fields. *Preq:* MTHSC 105 or satisfactory score (520) on the Mathematics Test, Level II (standard) or consent of instructor.

CP SC 102, H102 Computer Science II 4(3,2) Continuation of CP SC 101, with continued emphasis on problem solving and program development techniques. Typical numerical, nonnumerical, and data processing problems are examined. Basic data structures are introduced. *Preq:* CP SC 101.

CP SC 105 Essential Computer Skills 1(0,2) Computer literacy, user environments, and software packages for education. Credit may not be received for both CP SC 105 and 120.

CP SC 110, H110 Elementary Computer Programming 3(3,0) [C.3] Introduction to computer programming and its use in solving problems, intended primarily for technical majors. Basic instruction in programming techniques is combined with tools use and discussions of ethical issues arising from the impact of computing on society.

CP SC 111 Elementary Computer Programming in C/C++ 3(3,0) [C.3] Introduction to computer programming in C/C++ and its use in solving problems. Intended primarily for technical majors. Basic instruction in programming techniques is combined with tools use and discussions of ethical issues arising from the impact of computing on society.

CP SC 120 Issues in Computers 3(2,2) [C.3] Investigation of issues facing society based on the integration of computers into the everyday lives of professionals and citizens. Students explore the ethical issues that result from the extensive use of computers in complex information systems and the presence of computers in an increasing array of equipment and appliances.

CP SC 130 Data Processing with COBOL 3(3,0) Introduction to data processing techniques and applications. Emphasis is on the organization and processing of data files. The COBOL programming language is used. *Preq:* CP SC 110 or 120, or equivalent.

CP SC 157 Introduction to C Programming 2(2,0) Introduction to basic programming techniques. The C programming language will be used.

CP SC 210, H210 Programming Methodology 4(3,2) [C.3] Introduction to programming techniques and methodology. Topics include structured programming, stepwise refinement, program design and implementation techniques, modularization criteria, program testing and verification, basic data structures, and analysis of algorithms. Credit may not be received for both CP SC 102 and 210. *Preq:* CP SC 110 or 130, or equivalent.

CP SC 211 Advanced Programming Methodology 4(3,2) [C.1] Introduction to problem solving and programming methodology. Emphasis is on program design and implementation techniques, program testing and verification, and basic algorithm analysis. *Preq:* High school programming course.

CP SC 220 Microcomputer Applications 3(3,0) Applications of microcomputers to formulate and solve problem models. Emphasis is placed on applications development in database and spreadsheet environments. Current software products are used. *Preq:* CP SC 120 or MGT 399 or equivalent experience.

CP SC 221 Introduction to a Computer Science Language 1(0,2) Introduction to the systems programming environment; languages and interfaces for programming operating systems tasks; use of the C programming language and UNIX operating system. *Preq:* CP SC 101.

CP SC 231, H231 Computer Science III 4(3,2) Study of the machine architectures on which algorithms are implemented; requirements of architectures that support high-level languages, programming environments, and applications. *Preq:* CP SC 102 or 210 or equivalent.

CP SC 241, H241 Computer Science IV 4(3,2) Study of the data structures and algorithms fundamental to computer science; abstract data-type concepts; measures of program running time and time complexity; algorithm analysis and design techniques. Credit may not be received for both CP SC 241 and 340. *Prq:* CP SC 102 or 210 and CP SC 221 and MTHSC 119.

CP SC 270 Fundamentals of Information Systems 4(3,2) Computer information systems in a large-scale computing environment are used to address systems analysis and design, database management, data communication, and security of information. Reading knowledge of a business-oriented programming language is developed. May not be counted for credit toward a Computer Science or Computer Information Systems degree. *Prq:* CP SC 120.

CP SC 281 Selected Topics in Computer Science 1-4(0-3,0-6) Areas of computer science in which new trends arise. Innovative approaches to a variety of problems in the use and understanding of basic computing concepts are developed and implemented. *Prq:* Consent of instructor.

CP SC 291 Seminar in Professional Issues I 1(1,0) Impact of computer use on society is considered. Ethical use of software and protection of intellectual property rights are discussed. The profession is viewed historically; organizations important to the profession are discussed; the development process for standards is presented; and the students are introduced to the professional literature. *Prq:* CP SC 241 or consent of instructor.

CP SC 330, H330 Computer Systems Organization 4(3,2) Introduction to the structure and programming of computer systems. Various hardware/software configurations are explored and presented as integrated systems. Topics include basic computer organization, input/output organizations, interrupt processing and system software. *Prq:* CP SC 231, E C E 201 and MTHSC 119.

CP SC 332, H332 Computer Systems 3(3,0) Introduction to the design, integration, and use of hardware and software components in standard computer systems. Emphasis is on computer organization at the component level, interfacing, basic operating system functions, and system utilities. Credit may not be received for both CP SC 332 and 422. *Prq:* CP SC 231. *Coreq:* CP SC 221.

CP SC 340 Algorithms and Data Structures 3(3,0) Basic concepts of data structures such as queues, stacks, and lists; methods of proof as they relate to program verification; sets, functions, and relations as they relate to the analysis of algorithms. Includes the study of algorithms, time complexity, and design techniques. Credit may not be received for both CP SC 241 and 340. *Prq:* CP SC 102 or 210.

CP SC 350 Foundations of Computer Science 3(3,0) Development of the theoretical foundations of programming, algorithms, languages, automata, computability, complexity, data structures, and operating systems; a broad range of fundamental topics is consolidated and extended in preparation for further study. *Prq:* CP SC 241; MTHSC 119.

CP SC 360 Peripherals and File Design 3(3,0) Study of peripheral devices and data management as a basis for the design of information systems. Traditional data processing applications are presented and evaluated in terms of efficiency and effectiveness. Problems using standard file organization and access techniques are assigned. *Prq:* CP SC 241 or consent of instructor.

CP SC 361 Data Management Systems Laboratory 1(0,2) Introduction to mainframe environments typical of large-scale data processing applications; programming languages, control languages, and file utilities; use of COBOL language and IBM JCL. *Prq:* CP SC 102 or 210; or equivalent. *Coreq:* CP SC 360.

CP SC 371 Systems Analysis 3(3,0) Incorporates a study of the decision-making process at all levels with the logical design of information systems. Extensive study of the system life cycle with emphasis on current as well as classical techniques for describing data flows, data structures, file design, etc. *Prq:* CP SC 360.

CP SC 372 Introduction to Software Development 3(3,0) Techniques and issues in software design and development; tools, methodologies, and environments for effective design, development, and testing of software; organizing and managing the development of software projects. *Prq:* CP SC 241 or equivalent.

CP SC 405, 605 Introduction to Graphical Systems Design 3(3,0) Principles, computational techniques, and design concepts needed for designing systems for effective graphical displays. *Prq:* MTHSC 108, 311; CP SC 241.

CP SC 411, 611 Virtual Reality Systems 3(3,0) Design and implementation of software systems necessary to create virtual environments. Techniques for achieving real-time, dynamic display of photorealistic, synthetic images are discussed. Includes hands-on experience with electromagnetically-tracked, head-mounted displays and requires, as a final project, the design and construction of a virtual environment. *Prq:* CP SC 241, MTHSC 108, 311.

CP SC 412 Eye Tracking Methodology and Applications 3(3,0) Introduction to the human visual system; visual perception; eye movements; eye tracking systems and applications in psychology, industrial engineering, marketing, and computer science; hands-on experience with real time, corneal-reflection eye trackers, experimental issues. Final project requires the execution and analysis of an eye tracking experiment. *Prq:* CP SC 360, I E 488, MKT 431, or PSYCH 310.

CP SC 422, H422, 622 Introduction to Operating Systems 3(3,0) Detailed study of the management techniques for the control of computer hardware resources. Topics include interrupt systems, primitive level characteristics of hardware and the management of memory, processor, devices, and data. Credit may not be received for both CP SC 332 and 422. *Prq:* CP SC 231, 360. *Coreq:* CP SC 221.

CP SC 423, H423, 623 Implementation of Operating Systems 3(2,2) Detailed review of the implementation of an existing, multi-tasking operating system. Extension of concepts in laboratory to development and implementation of a sys-

tem nucleus supporting multi-tasking and process coordination on an actual computer system. Emphasis is given to design decisions as they apply to performance and complexity. *Prq:* CP SC 332 or 422, or equivalent.

CP SC 428, H428, 628 Design and Implementation of Programming Languages 3(3,0) Overview of programming language structures and features and their implementation. Control and data structures found in various languages are studied. Runtime organization and environment and implementation models are also included. *Prq:* CP SC 231 and 241 or equivalent.

CP SC 429, H429, 629 Translation of Programming Languages 3(3,0) Techniques and considerations for compiling and interpreting programming languages. Topics include scanning, parsing, optimization, code generation, and their theoretical foundations. Implementation of a compiler or a major component of a compiler normally is a term project. *Prq:* CP SC 350, 428.

CP SC 450, H450, 650 Theory of Computation 3(3,0) Introduction to models of computation and machine description languages, including finite-state automata and regular expressions, push-down automata and context-free languages, and Turing machines and recursive functions. Topics include equivalence and relative computing power of the models studied, enumeration, Church's thesis, and undecidability problems. *Prq:* CP SC 350.

CP SC 455, 655 Computational Science 3(3,0) Introduction to the methods and problems of computational science. Course uses problems from engineering and science to develop mathematical and computational solutions. Case studies use techniques from Grand Challenge problems. Emphasizes the use of networking, group development, and modern programming environments. *Prq:* MTHSC 108, 311 and previous programming experience in a higher level language.

CP SC 462, H462, 662 Database Management Systems 3(3,0) Introduction to database/data communications concepts as related to the design of online information systems. Problems involving structuring, creating, maintaining, and accessing multiple-user databases are presented and solutions developed. Comparison of several commercially available teleprocessing monitor and database management systems is made. *Prq:* CP SC 360.

CP SC 463, 663 Online Systems 3(3,0) In-depth study of the design and implementation of transaction processing systems and an introduction to basic communications concepts. A survey of commercially available software and a project using one of the systems are included. *Prq:* CP SC 462.

CP SC 464, 664 Introduction to Computer Architecture 3(3,0) Survey of von Neumann computer architecture at the instruction-set level. Fundamental design issues are emphasized illustrated using historical and current mainframe, supermini, and micro architecture. *Prq:* CP SC 330 or consent of instructor.

CP SC 472, H472, 672 Software Development Methodology 3(3,0) Advanced topics in software development methodology. Techniques such as chief programmer teams, structured design and structured walk-throughs are discussed and used in a major project. Emphasis is on the application of these techniques to large-scale software implementation projects. Additional topics such as mathematical foundations of structured programming and verification techniques are also included. *Preq:* CP SC 360 and 372.

CP SC 481, H481, 681 Selected Topics 1-3(1-3,0) Areas of computer science in which non-standard problems arise. Innovative approaches to problem solutions which draw from a variety of support courses are developed and implemented. Emphasis is on independent study and projects. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Consent of instructor.

CP SC 491 Seminar in Professional Issues II 1(1,0) The impact of computing system development on society is considered. Ethical issues in the design and development of computer software are discussed. Standards for professional behavior, the professional's responsibility to the profession, and techniques for maintaining currency in a dynamic field are discussed by students. *Preq:* Senior standing.

CP SC H495 Senior Thesis Research 1-3(1-3,0) Directed individual research project for honors students supervised by departmental faculty. May be repeated for a maximum of six credits. *Preq:* Senior standing.

CONSTRUCTION SCIENCE AND MANAGEMENT

Professor: R. W. Liska, *Acting Chair; Associate Professors:* D. W. Coffey, F. M. Eubanks, J. M. Mumford; *Assistant Professors:* S. N. Clarke, D. W. Goodloe, C. A. Piper; *Lecturer:* D. C. Bauman

C S M 100 Introduction to Construction Science and Management 3(2,3) Introduction to the principles, terminology, and communication techniques in the construction industry. *Preq:* DESIGN 151 and 153, or consent of department chair.

C S M 201 Structures I 3(3,0) Study of statically determinate structural components and systems including force applications and distributions in structural elements and the resulting stress-strain patterns in axial, shear, and bearing mechanisms. *Preq:* MTHSC 102 or 106, one semester of science requirement, DESIGN 153 or consent of instructor.

C S M 202 Structures II 3(3,0) Study of force distribution and behavior in statically determinate wood and steel structural components and systems including shear and moment stress, combined loading/stress conditions and deflections. *Preq:* C S M 201.

C S M 203 Materials and Methods of Construction I 3(3,0) Descriptive study of the materials and methods of construction, focusing on the nomenclature, building materials, and the assembly of building systems consisting primarily of wood, masonry, residential interior and exterior finishes, and building foundations. *Preq:* DESIGN 151 and 153, or consent of department chair.

C S M 204 Contract Documents 3(2,3) Introduction to working drawings, specifications, and the various documents required to carry out a typical construction project. *Preq:* C S M 203, Construction Science and Management major, or consent of department chair.

C S M 205 Materials and Methods of Construction II 3(3,0) Descriptive study of the materials and methods of construction, focusing on the nomenclature, building materials, and the assembly of building systems consisting primarily of steel and concrete in addition to roofing assemblies and interior and exterior commercial finishes. *Preq:* C S M 203 or consent of department chair.

C S M 301 Structures III 3(3,0) Analysis and design of basic determinate and indeterminate masonry and reinforced concrete structural components and systems; introduction to special structural systems and seismic loading. *Preq:* C S M 202 or consent of department chair.

C S M 303 Soils and Foundations 3(2,3) Various types of soils are studied, including related activities of testing, compaction, stability, and function. *Preq:* C S M 202, Construction Science and Management major, or consent of department chair.

C S M 304 Environmental Systems I 3(3,0) Theory of heating, ventilating, air conditioning, electrical, lighting, and plumbing systems as related to building. *Preq:* Junior standing.

C S M 310 Principles of Industrial Safety Management 3(3,0) Fundamentals of industrial safety management, including loss prevention, industrial hygiene and fire protection. *Preq:* Junior standing.

C S M 311 Accident Prevention and Loss Control 3(3,0) Philosophies and techniques of accident prevention and loss control, including risk assessment, hazard analysis, accident/near miss investigation, and methods to control and correct loss-producing conditions; also application of these techniques to current technologies. *Preq:* Junior standing.

C S M 312 Industrial Recognition and Control 3(3,0) Application of basic physical properties to the understanding, recognition, evaluation, and control of biological, mechanical, electrical, thermal, chemical, ergonomic, and nuclear hazards in the industrial setting. *Preq:* Junior standing.

C S M 351 Construction Estimating 3(2,4) Basic estimating as applied to construction projects. Includes the take-off of material quantities, assigning labor and equipment production rates, and applying material prices, wage rates, and equipment costs to derive a total job cost. *Preq:* C S M 204, Construction Science and Management major, or consent of department chair.

C S M 352 Construction Scheduling 3(2,4) Analysis of construction projects with emphasis on estimating, scheduling, and resource leveling. *Preq:* C S M 351, Construction Science and Management major, or consent of department chair.

C S M 353 Construction Estimating II 3(2,4) Continuation of basic construction estimating with the additional component of computerized estimating. Includes material, labor and equipment costs, production rates, bid ethics, constructability analysis, and understanding of other types

of estimating procedures. *Preq:* C S M 351, Construction Science and Management major, or consent of department chair.

C S M 410 Fire Protection and Prevention 3(3,0) Fundamental course to increase awareness of the causes of uncontrolled fires and explosions. Associated dangers to life, property, and industrial/commercial productivity are stressed, along with techniques available for their protection (education, detection, suppression). *Preq:* Junior standing.

C S M 411 Safety in Building Construction 3(3,0) Study of construction safety management and controls. *Preq:* Junior standing in Construction Science and Management or consent of department chair.

C S M 453 Construction Project Management 3(2,4) Study of construction business organization, methods of project delivery, field organization, policy, ethics, project management, control systems, labor management relations, and productivity. *Preq:* C S M 352, Construction Science and Management major, or consent of department chair.

C S M 454 Construction Capstone 6(2,12) A terminal project will be accomplished that demonstrates a refinement of previous knowledge gained in technical, management, and general education courses. *Preq:* C S M 453, Construction Science and Management major, or consent of department chair.

C S M 455, 655 Reducing Adversarial Relations in Construction 3(3,0) Focuses on the study of the delivery of projects and how adversarial relations can affect the successful completion of the venture. Topics include the management of human resources, understanding the needs and processes of the participants, where the problems lie, methods of avoiding and settling disputes. *Preq:* Architecture and/or Construction Science and Management majors, or consent of instructor.

C S M 461 Construction Economics Seminar 3(3,0) Studies in the financial performance of construction companies. *Preq:* ACCT 203 and Senior standing, Construction Science and Management major, or consent of department chair.

C S M 490, H490 Directed Studies 1-3(1-3,0) Comprehensive studies and research of special topics not covered in other courses. Emphasis is placed on field studies, research activities, and current development in construction science. May be taken for a maximum of six credits. *Preq:* Consent of instructor.

C S M 491 Construction Science and Management Internship and Examination 0 Eight hundred hours of verifiable construction-related experience. Verification of having taken the Certified Professional Constructor Examination.

C S M 498 Current Topics in Construction 1-3(1-3,0) Study of current topics in the construction industry not central to other construction science courses. Specific titles and course descriptions to be announced from semester to semester. May be taken for a maximum of six credits. *Preq:* Consent of advisor.

CROP AND SOIL ENVIRONMENTAL SCIENCE

Professors: S. R. Chapman, R. E. Franklin, B. J. Jossett, W. D. Graham, Jr., Chair; H. T. Knap, A. R. Mazur, J. H. Palmer, V. L. Quisenberry, J. S. Rice, E. R. Shippe, H. D. Skipper, B. R. Smith, S. U. Wallace, T. Whitwell; *Associate Professors:* J. J. Ammerato, N. H. Ferguson, W. C. Stringer, R. A. Wing; *Adjunct Associate Professor:* P. G. Hartel

CSENV 100 Introduction to Crop and Soil Environmental Science 1(1,0)F Introduction to and survey of the agronomic and soil sciences and their application to current societal issues: career guidance, opportunities for professional certification, and discussion of skills used by agronomists and soil scientists.

CSENV 202 Soils 4(3,2) Introduction to world land resources, soil formation, classification, and mineralogy. Emphasis is on the basic chemical and physical properties of soil. Soil microorganisms, plant nutrients, and fertilization are discussed. Soil properties are related to growth. *Preq:* CH 101, 102 or a geology sequence including GEOL 101, or consent of instructor.

CSENV 350 Practicum 1-3 Preplanned internship undertaken with an approved agency concerned with agronomic practices. Restricted to students with a major or a minor in Crop and Soil Environmental Science. Maximum of three credits allowed. *Preq:* Consent of department chair.

CSENV 403, 603 Soil Genesis and Classification 2(1,3)F Study of soil morphology and characterization, pedogenic processes, soil-forming factors, and classification of soils. *Preq:* CSENV 202 or consent of instructor.

CSENV 404, 604 Soils and Land Use 2(1,3)F Soils interpretations for nonagricultural purposes and facilities. Emphasis is on use of modern soil surveys and properties and features of soils important in nonfarm land uses. Not open to Crop and Soil Environmental Science majors or Agronomy minors or to students who have taken CSENV 202.

CSENV 405, 605 Plant Breeding 3(2,2)S The application of genetic principles to the development of improved crop plants. Principal topics include the genetic and cytogenetic basis of plant breeding, mode of reproduction, techniques in selfing and crossing, methods of breeding, inheritance in the major crops, and biometrical methods. *Preq:* GEN 302 or equivalent.

CSENV 406 Special Problems 1-3(0,3-9) Acquaints undergraduate students with the scientific method. Literature investigation, planning, and execution of an experiment are integral parts of the course. Not available to AGRIC H491 and H492 students. Maximum of six credits allowed. *Preq:* Senior standing as a major or minor in Crop and Soil Environmental Science and consent of department chair.

CSENV 407, H407, 607 Weed Ecology and Management 3(2,2)F Weeds, their introduction, ecology, methods of reproduction, dissemination, and management; chemistry and mode of action of herbicides, equipment and techniques of application; and a characterization of the common weeds of the Southeast. *Preq:* AGRIC 104, CSENV 202, or consent of instructor.

CSENV (B E) 408, 608 Land Treatment of Wastewater and Sludges 3(3,0)S Principles for designing environmentally acceptable land application systems using municipal and industrial wastewater and sludges are presented. Topics include land-limiting constituent analysis; soil-plant interactions; system equipment and design; system operation and management; public acceptance, social, and regulatory issues. Case studies and field trip(s) are planned. *Preq:* Senior standing in Agriculture or Engineering or consent of instructor.

CSENV 421, 621 Principles of Field Crop Production 3(2,3)F Principles for production of field crops. Topics include botany and physiology, tillage, harvesting, storage, and crop quality. Principles are illustrated using examples from various crops. *Preq:* AGRIC 104 or equivalent introductory plant science, CSENV 202.

CSENV 422, 622 Major World Crops 3(3,0)S Examines the distribution, adaptation, production, and utilization of major agronomic crops of the world. Emphasis is given to crops important to U.S. agriculture. Specific crops discussed in more detail include corn, wheat, rice, sorghum, soybean, cotton, tobacco, and peanuts. *Preq:* AGRIC 104 or equivalent introductory plant science, CSENV 202.

CSENV 423, H423, 623 Field Crop—Forages 3(3,0)S Establishment, management, and utilization of forage crops in a forage-livestock agroecosystem context. Hay, silage, and pasture utilization are discussed. Computer model used to study complexity of forage-livestock production systems. *Preq:* AGRIC 104, CSENV 202, or consent of instructor.

CSENV 425, 625 Seed Science and Technology 3(2,2)S Even-numbered years. Topics include seed development, germination, dormancy, pathology, storage, and deterioration. Seed testing and commercial production of seeds are also covered. Emphasis is on useful applications of current seed science knowledge. *Preq:* AGRIC 104, BIOSC 205.

CSENV (AP EC) 426, 626 Cropping Systems Analysis 3(2,2)F Application of agronomic and economic principles in solving problems relating to the production and marketing of agronomic crops. A major part of the course is a case study in which a detailed analysis of a farm, agribusiness or environmental situation is made with students making formal written and oral presentations of results. *Preq:* AP EC 202, AGRIC 104, Junior or Senior standing.

CSENV (HORT) 433, 633 Integrated Weed Management for Agronomic and Horticultural Crops 3(2,2)S See HORT 433.

CSENV 446, 646 Soil Management 3(3,0)F Basic soil properties are related to compaction, water and solute movement, and root growth. Practical management problems are considered and solutions developed based upon basic soil characteristics. Problems include erosion, no-tillage, compaction, irrigation, leaching, waste application, golf-green management, and orchard establishment. *Preq:* CSENV 202.

CSENV 452, 652 Soil Fertility and Management 3(3,0)S Soil properties, climatic factors, and management systems in relation to soil fertility main-

tenance for crop production; plant nutrition and growth in relation to crop fertilization and management. *Preq:* CSENV 202 or consent of instructor.

CSENV 453, H453, 653 Soil Fertility Laboratory 1(0,3)S Evaluation and interpretation of soil fertility production. *Preq:* CSENV 202 or consent of instructor.

CSENV 455 Seminar 1(1,0)F Student presentation of current agronomic topics of special interest in crop production appearing in recent scientific journals and other publications.

CSENV 475, H475, 675 Soil Physics and Chemistry 3(2,3)S Study of the principles of soil physics and chemistry and their applications. Topics include soil texture, structure, compaction, water relations, solute movement, mineral composition, adsorption phenomenon, and soil acidity. *Preq:* CSENV 202, CH 101, 112, PHYS 207.

CSENV 490, 690 Beneficial Soil Organisms in Plant Growth 3(3,0)S Aspects of biological nitrogen fixation, mycorrhizal fungi, microbial-pesticide interactions, bioremediation, nutrient cycles, and biological pest control related to plant growth, soil/environmental quality; and sustainable agriculture are covered. Students who desire laboratory experience in these topics can register for CSENV 406 after consultation with instructor. *Preq:* CSENV 202, MICRO 305, PL PA 401, or consent of instructor.

DANCE

DANCE 150 Modern Dance 1 1(0,3) Introduction to the basic principles of dance movement and vocabulary. Active exploration and application of body alignment and theory. Students who have received credit for L S 190 may not also receive credit for DANCE 150.

DESIGN STUDIES

Professors: J. R. Caban, Chair; L. G. Craig, T. K. Doruk, R. J. Hogan, R. B. Norman; *Associate Professors:* H. C. Harriotts, N. J. Hurt, D. J. Hutton, G. W. Patterson, M. H. Rice, R. T. Silance; *Assistant Professors:* R. T. Huff, R. K. McGill; *Lecturers:* B. Doruk, I. Ioannou, C. L. Martin

DSIGN 151 Design Studies I 3(1,6) Introduction to problem-solving methodology for environmental design through studio exercises, projects, and reviews. *Coreq:* DSIGN 153, admission to the College of Architecture.

DSIGN 152 Design Studies II 3(1,6) Continuation of DSIGN 151. *Coreq:* DSIGN 151. *Coreq:* DSIGN 154.

DSIGN 153 Design Theory I 1(1,0) Introduction to concepts and principles of architecture, visual arts, landscape architecture, urban and regional planning, and construction management. *Coreq:* DSIGN 151.

DSIGN 154 Design Theory II 1(1,0) Continuation of DSIGN 153. *Coreq:* DSIGN 152.

DSIGN 251 Design Studies III 5(0,10) Studio work with adjunct demonstrations and lectures concerned with basic architectural design problems. *Preq:* DSIGN 152. *Coreq:* DSIGN 253.

DSIGN 252 Design Studies IV 5(0,10) Continuation of DSIGN 251. *Prq:* DSIGN 251. *Coreq:* DSIGN 254.

DSIGN 253 Design Theory III 1(1,0) Introduction to fundamental ideas and issues of architecture through the presentation of topics on theory, technology, and practice.

DSIGN 254 Design Theory IV 1(1,0) Continuation of DSIGN 253.

DSIGN 321 Wood Shop Practices, Materials, Tools and Equipment 3(1,6) Instruction in the use of a full range of shop machinery, tools, equipment, and craftsmanship as well as an orientation to a wide variety of materials, techniques, and procedures. The paramount importance of safety is continually emphasized. *Prq:* Consent of instructor.

DSIGN 351 Design Studies V 5(0,10) Studio work with adjunct demonstrations and lecturers concerned with intermediate architectural design problems. *Prq:* DSIGN 252. *Coreq:* DSIGN 353.

DSIGN 352 Design Studies VI 5(0,10) Continuation of DSIGN 351. *Prq:* DSIGN 351. *Coreq:* DSIGN 354.

DSIGN 353 Design Theory V 1(1,0) Continued study of ideas and issues of architecture through the presentation of topics on theory, technology, and practice.

DSIGN 354 Design Theory VI 1(1,0) Continuation of DSIGN 353.

DSIGN 451 Design Studies VII 5(0,10) Studio work with adjunct seminar/lecture concerned with advanced architectural design problems. *Prq:* DSIGN 352. *Coreq:* DSIGN 453.

DSIGN 452 Design Studies VIII 5(0,10) Continuation of DSIGN 451. *Prq:* DSIGN 451. *Coreq:* DSIGN 454.

DSIGN 453 Design Theory VII 1(1,0) Study of advanced ideas and issues of architecture through the presentation of topics on theory, technology, and practice.

DSIGN 454 Design Theory VIII 1(1,0) Continuation of DSIGN 453.

ECONOMICS

Professors: D. K. Benjamin, D. W. Blair, W. R. Dougan, *Chair;* R. D. Elliott, C. M. Lindsay, R. E. McCormick, M. T. Maloney, R. D. Sauer, Jr., G. R. Thompson, M. S. Wallace, J. T. Warner; *Associate Professors:* D. B. Gordon, D. L. Placone, C. J. Simon, R. F. Tamura; *Assistant Professor:* C. F. Thornberg

ECON 200 Economic Concepts 3(3,0) Comprehensive course including both micro- and macroeconomic concepts for students not having theoretical course requirement beyond the principles level or for students expecting to take a selected group of the 300-level courses in economics. Credit will not be given to students who previously have completed ECON 211 or 212.

ECON 201 Principles of Economics 3(3,0) Comprehensive and intense one-semester examination of microeconomics and macroeconomics. Covers supply and demand, basics of microeconomics, and basics of macroeconomics. Using economics to understand the world around us is stressed throughout the course. More mathematical sophistication is assumed than in other 200-level economics courses. *Prq:* MTHSC 106.

ECON 211, H211 Principles of Microeconomics 3(3,0) Intensive study of the economics of the firm, pricing of resources, and international economic relations. Theory is given relevance through the analysis of current economic problems.

ECON 212, H212 Principles of Macroeconomics 3(3,0) Fundamental principles of price-level determination, stabilization, and growth in a modern economy. Topics include employment theory, monetary and fiscal policy, and economic growth. *Prq:* ECON 211 or consent of instructor.

ECON 301 Economics of Labor 3(3,0) Introduces students to the economics of the labor market and labor relations. Considers the theories of wages and employment, determination, unemployment, investment in human capital, discrimination, and public policy toward the labor market. Also considers the role of labor unions. Cannot be used to satisfy requirements for a degree in Economics. *Prq:* ECON 200 or 201 or 211.

ECON 302 Money and Banking 3(3,0) Considers the function of money and banking in both the product and financial markets. Special emphasis is placed on monetary theory and current problems of monetary policy. Cannot be used to satisfy requirements for a degree in Economics. *Prq:* ECON 200 or 201 or 211.

ECON (MGT) 306 Managerial Economics 3(3,0) Uses tools of economic analysis in classifying problems in organizing and evaluating information, and in comparing alternative courses of action. Bridges the gap between economic theory and managerial practices. Cannot be used to satisfy requirements for a degree in Economics. *Prq:* ECON 200 or 201 or 211.

ECON 307 Arbitration 3(3,0) Analysis of dispute settlement procedures with specific emphasis on mediation, fact-finding, and arbitration as they are used to resolve labor-management disputes in the public and private sectors. *Prq:* Consent of instructor.

ECON 308 Collective Bargaining 3(3,0) Practices, procedures, legal foundations, and legal structure associated with collective bargaining. Form and content of the labor contract, grievance machinery, and mediation and arbitration institutions are also studied. *Prq:* ECON 200 or 211.

ECON 309 Government and Business 3(3,0) Relationships between government and business, including, among other topics, government efforts to enforce competition; to regulate public utilities; and to protect the special interest of laborers, farmers, and consumers. *Prq:* ECON 200 or 211.

ECON 310 International Economy 3(3,0) Studies of the process of international commerce. Covers basic theory of trade and exchange rates, institutional and legal environment, current policy issues. Not open to students who have taken ECON 412. Cannot be used to satisfy requirements for a degree in Economics. *Prq:* ECON 200 or 201 or both 211 and 212, or consent of instructor.

ECON 314 Intermediate Microeconomics 3(3,0) Analytical study of the basic concepts of value and distribution under alternative market conditions. *Prq:* ECON 211 or 200 and consent of instructor.

ECON 315 Intermediate Macroeconomics 3(3,0) Formerly ECON 407. Macroeconomic problems of inflation and unemployment form the focal points. Statistics (GNP and the Consumer Price Index) and theory (Classical, Keynesian, and Monetarist views) are included. Pertinent public policies designed to deal with these problems are analyzed. *Prq:* ECON 212 or 200 or consent of instructor.

ECON 319 Environmental Economics 3(3,0) Study of the application of economic logic to issues surrounding environmental management and policy. Examines individual, firm, and collective decision making as well as the evolution of regulatory approaches for controlling environmental use. *Prq:* ECON 314.

ECON 324 Economics and Sports 3(3,0) Economic analysis of sports teams, leagues, and institutions. Analysis of basic economic issues using sports data. *Prq:* Sophomore standing and ECON 201 or 211.

ECON 325 Personnel Economics 3(3,0) Studies the various compensation and personnel practices that firms employ. Explains when each of those practices should be followed to elicit the desired employee effort and labor force quality. Topics include piece-rate and time-rate systems, seniority-based incentive schemes, promotion contests, evaluation systems, mandatory retirement, and up-or-out rules. *Prq:* ECON 200 or 211.

ECON H390 Junior Honors Research 1(1,0) Readings and research in conjunction with an approved economics course at the 300 or 400 level. Honors status required. May be taken three times.

ECON 401 Labor Market Analysis 3(3,0) Develops the methods of economic analysis of labor markets. Requires students to apply these methods to problems of the labor market. Topics include labor demand and supply, human capital, occupational choice, compensating wage differentials, organizational wage structures and incentive systems, unemployment, and discrimination. *Prq:* ECON 314.

ECON 404 Comparative Economic Systems 3(3,0) Comparative analytical and historical study of the principal economic systems which have been important in the modern world including, among others, capitalism and socialism. *Prq:* ECON 314 or consent of instructor.

ECON 405, 605 Introduction to Econometrics 3(3,0) Formerly ECON 311. Elements of time series analysis and introduction to the measurement, specification, estimation, and interpretation of functional relationships through single equation least square techniques. Problems of multicollinearity, dummy variables, heteroscedasticity, autocorrelation, and lagged variables in simple economic models are introduced. *Prq:* ECON 200 or 212; MTHSC 108 or 207; and EX ST 301 or MTHSC 301.

ECON 410, 610 Economic Development 3(3,0) Consideration and analysis of economic and related problems of underdeveloped countries. Attention is given to national and international programs designed to accelerate solution of these problems. *Prq:* ECON 314 or consent of instructor.

ECON 412 International Microeconomics 3(3,0) Analysis of the principles governing trade between nations. Topics include comparative advantage, theory and practice of commercial policy, introduction to exchange rates, and balance of payments. Not open to student who have taken ECON 310. *Preq:* ECON 314 or consent of instructor.

ECON 413 International Macroeconomics 3(3,0) Examination of macroeconomic problems of unemployment and inflation from the perspective of a national economy which is linked to and not independent of the world economy. *Preq:* ECON 315.

ECON 419 Economics of Defense 3(3,0) Examines the American defense establishment in terms of resources utilized, alternative uses, and the contribution to the national economy and scientific progress generated by resources in a defense use. Economic problems inherent in shifting resources between defense and nondefense uses and among alternative defense uses are discussed. *Preq:* ECON 314.

ECON 420 Public Sector Economics 3(3,0) Study of the role of government and its proper functions and limitations in a market. Provision of goods and services by all levels of government and instruments of taxation are evaluated according to efficiency and equity criteria. Contemporary public sector issues are emphasized throughout. *Preq:* ECON 314 or consent of instructor.

ECON 422 Monetary Economics 3(3,0) Intensive study of the role of monetary factors in economic change. Modern monetary theories and their empirical relevance for policy are developed against a background of monetary history and institutions. *Preq:* ECON 314 and 315 or consent of instructor.

ECON 424 Organization of Industries 3(3,0) Empirical, historical, and theoretical analyses of market structure and concentration in American industry: the effects of oligopoly, monopoly, and cartelization upon price, output, and other policies of the firm; antitrust and other public policies and problems are studied. *Preq:* ECON 314 or consent of instructor.

ECON 430 Topics in Mathematical Economics 3(3,0) Skills acquired in freshman mathematics are applied to selected topics in economic theory. Course is a good complement to ECON 314 and provides excellent preparation for 400-level courses in economics, especially ECON 405. May be taken concurrently with ECON 314. *Preq:* ECON 314 and either MTHSC 207 or 108.

ECON H491 Senior Honors Thesis Research 3(3,0) Reading and research for the Senior Honors Thesis. *Preq:* ECON 314 and 315 and senior honors standing.

ECON H492 Senior Honors Thesis Writing 3(3,0) Writing and oral presentation of the Senior Honors Thesis. *Preq:* ECON H491.

ECON 496 Independent Study 1-3(1-3,0) Research and writing on a selected economics topic chosen by the student. A written proposal must be approved by the instructor prior to the start of the semester. May be repeated for a maximum of six credit hours. *Preq:* ECON 314.

ECON 498 Current Topics in Economics 3(3,0) Discussion of current topics and research methods in economics. Students write several short papers on current issues. *Preq:* Consent of instructor.

ECON 499 Senior Seminar in Economics 1-3(1-3,0) Discussion of topics of current interest in economics. Students do directed research on a particular topic. *Preq:* Consent of instructor.

EDUCATION: CURRICULUM AND INSTRUCTION

Professors: A. D. Brooks, W. R. Fisk, *Interim Chair*; W. H. Leonard, B. E. Naff, J. F. Yukish; *Associate Professors:* S. W. Fones, L. B. Hart, K. S. Headley, E. M. Owens, D. A. Stevens; *Assistant Professors:* P. J. Dunston, R. M. Horton, R. A. Kaminski, V. G. Ridgeway, S. S. Warner; *Lecturers:* J. K. Weir, N. S. Wilkinson; *Visiting Assistant Professor:* L. S. Brown; *Visiting Instructors:* J. Feng, K. S. Sparks

ED 100 Orientation 1(1,0) Lectures and discussions on teaching. For a minimum of ten weeks, students spend one hour per week in schools assisting teachers, observing, and tutoring individuals. Required of all students in Early Childhood Education, Elementary Education, Secondary Education, Mathematics Teaching, and Science Teaching. To be taken Pass/Fail only.

ED 101 Reading Improvement 1(0,3) Provides an individualized approach to developmental reading skills emphasizing comprehension, vocabulary, and rate.

ED 102 Efficient Reading 1(0,3) Extends the reading skills of vocabulary, comprehension, and rate stressing skimming, scanning, flexibility, and critical reading.

ED 103 Learning Strategies 2(3,0) Students learn strategies of active learning and critical thinking skills which become an integral part of their natural thinking processes. Students learn how to generalize and apply newly acquired strategies to a variety of settings and situations.

ED 321 Physical Education for Elementary School: Games and Sports Skills 3(3,0) Values, purposes, and uses of creative games and games of low organization. Basic skills and lead-up activities for children. Methods of instruction and time allotments appropriate for elementary school programs. *Preq:* Junior standing (for Elementary majors); Senior standing and concurrent enrollment in ED 400, 459, 483, 488 (for Early Childhood Majors); Education major; minimum grade-point ratio of 2.0; or consent of instructor for non-education majors.

ED 400 Early Childhood Education Field Experience 3(0,9) Provides practical classroom experience in early childhood education prior to the student teaching semester for the Early Childhood Education major. For a twelve-week period, students spend two hours per week in schools observing, tutoring, conducting small group activities, and teaching the class. To be taken Pass/Fail only. *Preq:* ED 100, ED F 334, 336; concurrent enrollment in ED 459 and 483; senior standing; admission to the professional level.

ED 401 Elementary Field Experience 3(0,9) Provides practical classroom experience prior to the student teaching semester for Elementary Education majors. For a twelve-week period, students

spend two hours per week in schools observing, tutoring individuals, conducting small group activities, and teaching the class. To be taken Pass/Fail only. *Preq:* ED 100, ED F 334; concurrent enrollment in ED 460 and ED 488; admission to the professional level.

ED 412 Directed Student Teaching in Secondary School Subjects 12(1,33) Program of supervised observation and teaching in cooperation with selected public schools in which opportunities are provided for prospective teachers to obtain experiences in the subject area. Students are sectioned according to teaching fields: English, history, social science, mathematical sciences, modern languages, science. Enrollment is limited.

ED 417 Teaching Internship in the Secondary School 6(1,15) Full-time, supervised teaching internship for one semester in cooperation with a participating South Carolina secondary school. Reserved for students seeking certification in critical-need teaching areas. May be repeated for a maximum of 12 credits. To be taken Pass/Fail only. *Preq:* ED 301, 302, 335, ED 498, and one of the following: ED 424, 425, 426, 427. Application approved by the College of Education.

ED 424 Teaching Secondary English 3(2,2) Development of instructional practices and materials appropriate for secondary English; familiarization with curriculum materials; includes field experiences in local schools in preparation for student teaching. *Preq:* Second semester Junior standing, admission to the professional level, and concurrent enrollment in ED 498.

ED 425 Teaching Secondary Modern Languages 3(2,2) Development of instructional practices and materials appropriate for secondary modern languages; familiarization with curriculum materials; includes field experiences in local schools. *Preq:* Second semester Junior standing, admission to the professional level, and concurrent enrollment in ED 498.

ED 426 Teaching Secondary Mathematics 3(2,2) Development of instructional practices and materials appropriate for secondary mathematics; familiarization with curriculum materials; includes field experiences in local schools. *Preq:* Second semester Junior standing, admission to the professional level, and concurrent enrollment in ED 498.

ED 427 Teaching Secondary Science 3(2,2) Development of instructional practices and materials for teaching secondary school science (biological, earth, and physical sciences); familiarization with secondary science curriculum materials; includes field experiences in local schools. *Preq:* Second semester Junior standing, admission to the professional level, and concurrent enrollment in ED 498.

ED 428, H428 Teaching Secondary Social Studies 3(2,2) Development of instructional practices and materials appropriate for secondary social studies; familiarization with curriculum materials; includes field experiences in local schools in preparation for student teaching. *Preq:* Second semester Junior standing, admission to the professional level, and concurrent enrollment in ED 498.

ED 431, 631 Special Institute Course: Early Childhood Education 1-3(1-3,0) Subject areas organized according to institute needs. May be repeated for credit, but only if different topics are covered.

ED 432, 632 Special Institute Course: Elementary School 1-3(1-3,0) Subject areas organized according to institute needs. May be repeated for credit, but only if different topics are covered.

ED 433, 633 Special Institute Course: Secondary School 1-3(1-3,0) Subject areas organized according to institute needs. May be repeated for credit, but only if different topics are covered.

ED 434, 634 Special Institute Course: Current Problems in Education 1-3(1-3,0) Subject areas organized according to institute needs. May be repeated for credit, but only if different topics are covered.

ED 435, 635 Special Institute Course: Curriculum 1-3(1-3,0) Subject areas organized according to institute needs. May be repeated for credit, but only if different topics are covered.

ED 436 Special Institute Course: Supervision and Administration 1-3(1-3,0) Subject areas organized according to institute needs. May be repeated for credit, but only if different topics are covered.

ED 440, 640 Advanced Physical Education Methods for the Classroom Teacher 3(3,0) Helps experienced teachers in public schools expand their knowledge and understanding of physical education. *Prq:* ED 321 or equivalent and minimum grade-point ratio of 2.0.

ED 441, 641 Middle School Curriculum 3(3,0) Concepts and methods for teaching middle school students. Discusses nature of middle school students, teacher characteristics, curricular and co-curricular programs, organization and teaching.

ED 451 Elementary Methods in Science Teaching 3(3,0) Development of process skills, technical skills, and attitudes needed to foster increased confidence and commitment to the teaching of elementary science, with emphasis on teaching strategies and techniques and their implications for what we know of how children learn science. *Prq:* PH SC 107, 108; BIOL 109; concurrent enrollment in ED 401, 460, 487, 488 (for Elementary majors); admission to the professional level.

ED 452 Elementary Methods in Mathematics Teaching 3(3,0) Special emphasis is given the development of understanding, skills, and attitudes in the elementary curriculum with focus on strategies, techniques, and materials for teaching elementary mathematics. *Prq:* General Education math requirement; admission to the professional level.

ED 459, H459 Teaching Reading in the Early Grades: K-3 3(3,0) [W.1] Provides early childhood and elementary education majors with an understanding of teaching reading in the elementary school setting in kindergarten through third grade. Students investigate general principles of language and literacy development and learn methods for teaching and assessing children's literacy. *Prq:* ED F 301, 302, 336; admission to the professional level. *Coreq:* ED 400 for Early Childhood majors.

ED 460, H460 Teaching Reading in the Intermediate Grades 4-8 3(3,0) Provides elementary education majors with an understanding of teaching reading in the elementary school setting in grades four through eight. Students investigate general principles of language and literacy development and learn methods for teaching and as-

sessing children's literacy. *Prq:* ED F 301, 302, 334. *Coreq:* ED 401 for Elementary majors; admission to the professional level.

ED 466 Introduction to Early Childhood Education 3(3,0) Introductory course for Early Childhood Education, which includes an overview of curriculum for kindergarten and primary grades. *Prq:* ED F 336 or concurrent enrollment; admission to the professional level.

ED 481 Directed Teaching in the Elementary School 12(1,33) Supervised observation and teaching experiences in cooperation with selected elementary schools. Enrollment is limited to seniors or graduates who have completed prerequisite courses. *Prq:* ED 321, 401, 451, 452, 460, 487, 488; admission to the professional level and consent of the area committee chair.

ED 483 Methods and Materials for Early Childhood Education 3(3,0) Study of methods and materials applicable to nursery schools, kindergarten, and early elementary grades. *Prq:* ED 466; concurrent enrollment in ED 321, 400, 459, 488; admission to the professional level.

ED 484 Directed Teaching in Early Childhood Education 12(1,33) Supervised observation and teaching experiences in cooperation with nursery, kindergartens, and early elementary schools. Enrollment is limited to seniors or graduates who have completed prerequisite courses and have the accumulated grade-point ratio for graduation. *Prq:* ED 321, 400, 459, 483, 488; admission to the professional level and consent of the area committee chair.

ED 487 Teaching Social Studies in the Elementary School 3(3,0) Provides the pre-service teacher with an introduction to the skills of social studies and methods, materials, and techniques needed to teach these skills to students in the elementary school. *Prq:* HIST 172, 173; GEOG 101 or 103; concurrent enrollment in ED 401, 451, 460, 488 (for Elementary majors); admission to the professional level.

ED 488 Teaching the Language Arts in the Elementary School 3(3,0) [W.1] Provides the pre-service teacher with an introduction to the skills of the language arts other than reading and the methods, materials, and techniques needed to teach these skills to students in the elementary school. *Prq:* ENGL 102, 385; concurrent enrollment in ED 400, 459, 483 (for Early Childhood majors); concurrent enrollment in ED 401, 451, 460, 487 (for Elementary majors); admission to the professional level.

ED 498, H498 Secondary Content Area Reading 3(2,2) Designed for pre-service teachers who are involved with field experiences prior to student teaching full time. Prepares content area teachers to teach the reading skills necessary for effective teaching of content area material. *Prq:* Admission to Professional Level Education Program.

EDUCATIONAL COUNSELING

EDC 234 Introduction to Addictions: Basic Education and Prevention 3(3,0) Gives students a basic review of addictions and chemical dependence and gives future educators skills in the identification of chemical abuse, techniques for intervention, and methods of prevention education. SOC 396 and 397 are recommended as follow-up courses for those interested in pursuing the topic.

EDUCATIONAL FOUNDATIONS

Professors: D. E. Barrett, W. R. Fisk, Chair; R. P. Green, Jr.; *Associate Professors:* G. C. Delicio, C. L. Peters, L. B. Readon, D. M. Switzer, C. G. Weatherford; *Lecturer:* E. C. Williams

ED F 301, H301 Principles of American Education 3(3,0) Study of the legal basis, historical development, characteristics, and functions of educational institutions in the United States. *Prq:* Minimum grade-point ratio of 2.0.

ED F 302, H302 Educational Psychology 3(3,0) Introduction to classroom use of objectives, motivation theories, learning theories, tests and measurements, classroom management, and knowledge of exceptional learners. *Prq:* Minimum grade-point ratio of 2.0.

ED F (THRD) 315 Integrating Computers into the Classroom 1(0,2) Students learn how to use microcomputers to supplement the classroom curriculum and to enhance classroom management. *Prq:* Admission to a Teacher Education Program; ED F 301 and 302; fulfillment of the General Education computer skills requirement; minimum grade-point ratio of 2.0, or consent of instructor.

ED F 334, H334 Child Growth and Development 3(3,0) Introduction to lifespan development. Heavy emphasis is placed on the physical, social, emotional, and cognitive characteristics. Includes a minimum of 5 one-hour observation participation visits to an elementary school. *Prq:* ED 100 or concurrent enrollment and minimum grade-point ratio of 2.0; or consent of instructor for non-education majors.

ED F 335, H335 Adolescent Growth and Development 3(3,0) Introduction to lifespan development. Emphasis is on the physical, social, emotional, and cognitive characteristics of the 10- to 18-year old and the educational implications of those developmental characteristics.

ED F 336, H336 Behavior of the Preschool Child 3(3,0) Study of the behavior of the preschool child from infancy through age five. Theoretical concepts and observation of children's behavior are integrated, analyzed, and evaluated to discover implications for teaching and guiding preschool children. Includes a minimum of 10 one-hour observation-participation visits in public kindergarten. *Prq:* ED F 334, a minimum grade-point ratio of 2.0 or consent of instructor.

ED F 406 Philosophy, Schooling, and Educational Policy 3(3,0) Analysis of the development of contemporary educational theory and its impact on current schooling practices and educational policy development.

ED F (PRTM) 415, 615 Methods in Reducing Risks for Middle Childhood 3(2,3) Develops a knowledge base for professionals who work with at-risk children. Students work in a field setting to apply knowledge, develop and practice skills, and cooperate with professionals from various disciplines. *Prq:* Junior standing.

ED F 436, 636 Selected Topics in Educational Foundations 1-3(1,3,0) Offered as needed to address current issues and topics not covered in other foundations courses. May be repeated for a maximum of six credits, but only if different topics are covered. *Prq:* Junior standing in Education.

ED F 458 Health Education 3(3,0) [W.1] Study of the information needed for effective cooperation with parents, physicians, and public health agencies in the promotion and improvement of community health, including problems of personal hygiene, health records, immunization, and control of communicable disease. *Prq:* Minimum grade-point ratio of 2.0.

ED F (AG ED, THRD) 480, 680 Educational Applications of Microcomputers 3(2,2) [C.3] Fundamentals of computer applications for teachers. Develops competencies in general computer applications such as word processing and database management and addresses educational uses of the Internet and computer-assisted instruction, with emphasis on legal and ethical issues and the impact of computer technology upon society. *Prq:* Admission to a Teacher Education Program.

ED F (AG ED, THRD) 482, 682 Advanced Educational Applications of Microcomputers 3(2,2) Provides students with the knowledge and skills needed to apply microcomputer technology to the utilization and generation of educational software in accordance with sound educational principles. *Prq:* ED F (AG ED, THRD) 480.

ED F 490, 690 Student Management and Discipline 3(3,0) Aids pre-service and in-service teacher development and refines knowledge, skills, and values important for managing students in school settings. Practical application of theory and research and legal and ethical considerations are emphasized. *Prq:* ED F 302 or PSYCH 201; ED F 334 and 335 or suitable alternative; and minimum grade-point ratio of 2.0.

ED F 497, 697 Instructional Media in the Classroom 3(3,0) An integrated approach to the use of audiovisual media stressing systematic planning, selection, utilization, and evaluation as well as production of materials and equipment operation. *Prq:* Minimum grade-point ratio of 2.0.

EDUCATIONAL LEADERSHIP

ED L 390 Student Development, Leadership, and Counseling for University Paraprofessionals 3(3,0) Introduction to theoretical and practical applications of student development and leadership on the university campus. Skills assisting students with leadership development, problem solving, conflict resolution, confrontation, and referral are developed. Legal and ethical issues for practitioners and learning to effectively utilize resources available on the campus are explored.

ELECTRICAL AND COMPUTER ENGINEERING

Professors: C. M. Butler, D. M. Dawson, T. L. Drake, D. J. Dumin, A. A. Giris, J. N. Gowdy, *Chair*; J. W. Harrison, Jr., J. J. Komo, J. F. Leathrum, J. Y. Luh, E. B. Makram, L. W. Pearson, K. F. Poole, M. B. Pursley, R. J. Schalkoff, R. Singh; *Associate Professors:* C. W. Baum, E. G. Baxa, Jr., M. A. Bridgwood, E. R. Collins, Jr., W. B. Ligon III, D. L. Lubkeman, A. Q. Martin, I. D. Walker, X.-B. Xu; *Assistant Professors:* W. R. Harrell, D. L. Noneaker, R. R. Sass; *Visiting Assistant Professor:* S. J. Hubbard

E C E 201 Logic and Computing Devices 3(2,2) Study of logic with an introduction to Boolean algebra; number systems and representation of information; use of integrated circuits to implement combinational and sequential logic functions and computing elements; organization and structure of computing systems. *Prq:* MTHSC 108, PHYS 122.

E C E 202, H202 Electric Circuits I 3(3,0) DC resistive circuits, Kirchhoff's Laws, Nodal and Mesh emphasis, sources, Thevenin's and Norton's theorems, RC, RL, RCL circuit solutions with initial condition using homogenous or nonhomogenous ordinary differential equations having constant coefficients. Develop sinusoidal steady state solution. *Prq:* MTHSC 108, PHYS 122. *Coreq:* E C E 211, PHYS 221.

E C E 204 Circuit Analysis Problems I 1(0,3) Analysis and solution of electrical network problems using mesh and nodal analysis, Thevenin's and Norton's theorems and equivalent circuits and other circuit analysis from E C E 202. *Coreq:* E C E 202.

E C E 211 Electrical Engineering Laboratory I 1(0,2) Principles of measurement and instruments used to measure parameters and dynamic variables in electric circuits, steady state and transient measurements in DC and AC circuits, and data analysis methods are included. *Coreq:* E C E 202.

E C E 212 Electrical Engineering Laboratory II 1(0,2) Measurement techniques in AC steady-state circuits and comparison to theoretical predictions are emphasized. Two-port network methodology and transfer functions are studied experimentally and related to analysis using transform techniques. *Prq:* E C E 202, 211. *Coreq:* E C E 262.

E C E 262, H262 Electric Circuits II 3(3,0) Continuation of the study of electric circuits, including three-phase circuits, complex frequency and network functions, frequency response, two-port parameters, magnetically-coupled circuits, Laplace transforms, and introduction to Fourier series and transforms. *Prq:* E C E 202, MTHSC 206, PHYS 221. *Coreq:* E C E 212, MTHSC 208.

E C E 263 Circuit Analysis Problems II 1(0,3) Analysis of basic AC circuit analysis techniques to analyze the transient and steady-state behavior of both simple and complex circuits. *Coreq:* E C E 262, MTHSC 208.

E C E 272 Computer Organization 4(3,2) Introductory course in computer organization and architecture. Topics include basic hardware and software structure, addressing methods, programs control, processing units, I-O organization, arith-

metic, main-memory organization, peripherals, microprocessor families, RISC architectures, and multiprocessors. *Prq:* E C E 201 and CP SC 101 or 157 or 210 or 211.

E C E H300 Junior Honors Seminar 1(2,0) Acquaints students enrolled in the Electrical and Computer Engineering Departmental Honors Program with current research activities in the department. Faculty provide seminars where research interests are summarized. Seminars are planned to prepare students in choosing a research topic for their senior theses.

E C E 307 Basic Electrical Engineering 2(2,0) A first course in electrical engineering to provide non-Electrical Engineering majors with a knowledge of DC and AC circuit theory, AC power distribution, and numerous electrical devices, apparatus, and digital systems. *Prq:* MTHSC 206, PHYS 221. *Coreq:* E C E 309.

E C E 308 Electronics and Electromechanics 2(2,0) Continuation of E C E 307. Energy conversion systems are considered, as well as basic electronics. *Prq:* E C E 307.

E C E 309 Electrical Engineering Laboratory I 1(0,2) Laboratory to accompany E C E 307. Basic electrical circuits and instrumentation. *Coreq:* E C E 307.

E C E 311 Electrical Engineering Laboratory III 1(0,2) [W.1] Measurements and characteristics of electronic devices and circuits; use of manual and automated instruments to acquire data; oral and written engineering reports. *Prq:* E C E 262, MTHSC 208, PHYS 221. *Coreq:* E C E 320.

E C E 312 Electrical Engineering Laboratory IV 1(0,2) [W.1] Design and characterization of functional circuits using solid-state devices; use of manual and automated instruments for measurements; statistical analysis of data; and preparation of engineering reports. *Prq:* E C E 311, 320. *Coreq:* E C E 321.

E C E 317 Random Signal Analysis 3(3,0) Introduction to engineering problems of a probabilistic nature. Systems transformations, statistical averages, simulation, and estimation of system parameters. *Prq:* E C E 262, MTHSC 208. *Coreq:* E C E 330.

E C E 320 Electronics I 3(3,0) [O.1] Introduction to electronic materials and devices; principles of design; design of DC and AC circuits using diodes, bipolar junction transistors, field-effect transistors and use of transistors in digital circuits. *Prq:* E C E 262, MTHSC 208, PHYS 221. *Coreq:* E C E 311.

E C E 321 Electronics II 3(3,0) Analysis and design of discrete amplifier circuits at low and high frequencies; operational amplifiers, distortion in amplifiers, oscillator design, and circuit analysis of active digital devices. *Prq:* E C E 320. *Coreq:* E C E 312.

E C E 329 Computer Systems Structures 3(3,0) Fundamental structures and issues that arise in the analysis and implementation of computer systems. Topics include operating systems structures and data structures and their relationship to computer organization. Engineering science background for computer systems design. *Prq:* CP SC 102 or 210 or 211; CP SC 340 or 241; E C E 272.

- E C E 330, H330 Signals, Systems, and Transforms 3(3,0)** Systems models, analysis of signals, Fourier series and transforms, sampling and Z transforms, discrete Fourier transforms. *Prq:* E C E 262, MTHSC 208.
- E C E 352 Programming Systems 3(3,0)** Second course in programming languages and systems. Topics include assemblers, compilers, and syntactical methods; string manipulation and list processing; concepts of executive programs and operating systems; introduction to time-sharing systems. *Prq:* E C E 329, MTHSC 419.
- E C E 360 Electric Power Engineering 3(3,0)** Presents the basic principles of electromagnetic induction and electromagnetic forces developed. Topics include synchronous machines, power transformers, electric power transmission, and distribution systems, DC motors, and induction motors. *Prq:* E C E 262 and PHYS 221.
- E C E 371 Microcomputer Interfacing 4(1-3,1-3) [W.1]** Interfacing of microcomputers to peripherals or other computers for purposes of data acquisition, device monitoring and control, and other communications. The interfacing problem is considered at all levels including computer architecture, logic, timing, loading, protocols, and software laboratory for building and simulating designs. *Prq:* E C E 262, 272. *Coreq:* E C E 320.
- E C E 380 Electromagnetics 3(3,0)** Introduction to electric fields and potentials, dielectrics, capacitance, resistance, magnetic field, forces, work and energy, inductance, time-varying fields, and Maxwell's equations. *Prq:* E C E 262, PHYS 221, MTHSC 206.
- E C E 381 Fields, Waves, and Circuits 3(3,0)** Foundation of circuit theory, transmission lines and circuits, plane-wave propagation, fiber optics, radiation and antennas, coupled circuits. *Prq:* E C E 380, MTHSC 208.
- E C E 404, 604 Semiconductor Devices 3(3,0)** Consideration of the principles of operation, external characteristics, and applications of some of the more important semiconductor devices presently available. *Prq:* E C E 320. *Coreq:* MTHSC 311 or 434.
- E C E 405 Design Projects in Electrical and Computer Engineering 1-3(0,2-6)** Individually defined projects oriented toward providing experience in establishment of objectives and criteria, synthesis, analysis, construction, testing, and evaluation; development of student creativity through the solution of open-ended problems; individual instruction in design methodology. Maximum of three credit hours. *Prq:* E C E 302 or 330 or 409, consent of project supervisor.
- E C E 406, 606 Introduction to Microelectronics Processing 3(3,0)** Microelectronic processing, MOS and bipolar monolithic circuit fabrication, thick and thin film hybrid fabrication, applications to linear and digital circuits, fundamentals of device design. *Prq:* E C E 320. *Coreq:* MTHSC 311 or 434.
- E C E 409 Continuous and Discrete Systems Design 3(3,0)** Introduction to classical linear control systems. Topics include continuous and discrete descriptions of systems, time and frequency response, stability, system specification, system design of continuous and discrete systems. *Prq:* E C E 330. *Coreq:* E C E 495.
- E C E 410, 610 Modern Control Theory 3(3,0)** Introduction to modern control theory. Topics include fundamentals of matrix algebra, state space analysis and design, nonlinear systems and optimal control. *Prq:* E C E 409.
- E C E 412 Electrical Machines Laboratory 1(0,2)** Selected experiments to help students become familiar with characteristics of transformers, DC and AC motors and generators. Measurement techniques and component modeling are included. *Coreq:* MTHSC 434 or consent of instructor. *Prq or Coreq:* E C E 360 or 419.
- E C E 417, 617 Elements of Software Engineering 3(3,0) [W.1]** Foundations of software design, reasoning about software, the calculus of programs, survey of formal specification techniques and design languages. *Prq:* E C E 329, MTHSC 419.
- E C E 418, 618 Power System Analysis 3(3,0)** Study of power system planning and operational problems. Subjects covered are load flow, economic dispatch, fault studies, transient stability and control of problems. System modeling and computer solutions are emphasized through class projects. *Prq:* E C E 360, 380.
- E C E 419, 619 Electric Machines and Drives 3(3,0)** Performance, characteristics, and modeling of AC and DC machines during steady-state and transient conditions. Introduction to power electronics devices and their use in adjustable speed motor drives. *Prq:* E C E 321, 360, 380. *Coreq:* MTHSC 434 or consent of instructor.
- E C E 422, 622 Electronic System Design I 3(2,2)** Emphasizes the application of theory and skills to the design, building, and testing of an electronic system with both analog and digital components. Application varies each semester. Extensive use is made of computer software tools in the design process. *Prq:* E C E 321, 330, 360, 371, 381.
- E C E 426, 626 Digital Computer Design 3(3,0)** Design of high-speed ALUs, control and timing circuitry, memory systems and I/O circuitry; microprogrammed computer design using bit-slice microprocessors; current hardware topics related to computer design; hands-on design experience; and use of logic analyzer for system debugging. *Prq:* E C E 352, 371.
- E C E 427 Communications Systems 3(3,0)** Study of modulation techniques used in modern communications systems design, including continuous wave modulation (AM, FM, PM), analog and digital pulse modulation (PAM, PPM, PWM, PCM), and the impact of noise interference on these systems. *Prq:* E C E 317, 330. *Coreq:* MTHSC 434.
- E C E 429, 629 Organization of Computers 3(3,0)** Computer organization and architecture. Topics include a review of logic circuits, bus structures, memory organization, interrupt structures, arithmetic units, input-output structures, state generation, central processor organization, control function implementation, and data communication. Registered Transfer Language (RTL) for description and design of digital systems. *Prq:* CP SC 230 or E C E 250 or 272 or consent of instructor.
- E C E 430, 630 Introduction to Digital Communications 3(3,0)** Course in modern digital communications theory. Topics include discrete time signals, discrete Fourier transforms, channel bandwidth, channel distortion, coding of analog information, data signal encoding, introduction to decision theory, matched filter, baseband systems, AM, FM, PM, phase-locked loops, secure communications and contemporary communications systems. *Prq:* E C E 317 or MTHSC 400, E C E 330, MTHSC 311 or 434, or consent of instructor.
- E C E 431, 631 Digital Electronics 3(2,2)** Electronic devices and circuits of importance to digital computer operation and to other areas of electrical engineering are considered. Active and passive wave shaping, waveform generation, memory elements, switching, and logic circuits are some of the topics. Experimentation with various types of circuits is provided by laboratory projects. *Prq:* E C E 321. *Coreq:* MTHSC 311 or 434.
- E C E 432, 632 Instrumentation 3(3,0)** Theory and analysis of transducers and related circuits and instrumentation. Generalized configurations and performance characteristics of instruments are considered. Transducer devices for measuring physical parameters such as motion, force, torque, pressure, flow, and temperature are discussed. *Prq:* E C E 321. *Coreq:* MTHSC 311 or 434.
- E C E 434, 634 Power Electronics 3(3,0)** Study of electronic devices and systems which are designed to control or regulate large amounts of power. Included are SCR applications to inverters, motors controls, high-current switching systems, voltage stabilizers, and other power applications of electronics are also considered. *Prq:* E C E 321, 360. *Coreq:* MTHSC 434 or consent of instructor.
- E C E 436, 636 Transmission Lines and Microwave Circuits 3(3,0)** Study of theoretical and practical aspects of transmission lines and wave-guides; Smith Chart applications and design impedance matching networks, scattering parameters, interconnection and design of multiports. *Prq:* E C E 381 or equivalent. *Coreq:* MTHSC 311 or 434.
- E C E 438, 638 Computer Communications 3(3,0)** Digital data transmission techniques, modems and communications channels, communications software and protocols, multiprocessors and distributed processing; concurrency and co-operation of dispersed processors. *Prq:* Senior standing in Electrical or Computer Engineering or Computer Science or consent of instructor.
- E C E 439, 639 Fiber Optics 3(3,0)** The underlying principles of design for optical fibers in practical systems are covered. Optical fiber as a waveguide is examined using wave optics and ray optics. Design criteria for using mono- and multi-mode fibers are discussed. Other topics include fabrication, measurement. *Prq:* E C E 381. *Coreq:* MTHSC 434 or consent of instructor.
- E C E 440, 640 Performance Analysis of Local Computer Networks 3(3,0)** Introduction to the design and performance analysis of local computer networks. Emphasis is on performance analysis of representative multi-access procedures. Three common types of networks are considered in detail. *Prq:* E C E 272, 317 or MTHSC 400 or equivalent.
- E C E 442, 642 Knowledge Engineering 3(3,0)** Introduction to the theoretical and practical aspects of knowledge engineering or applied artificial intelligence. Topics include symbolic representation structures and manipulation, unification, production systems and structures, rule-based

and expert systems, planning and AI system architectures; system design in PROLOG and LISP. Project is required. *Preq:* E C E 329, 352.

E C E 446, 646 Antennas and Propagation 3(3,0) Study of the theoretical and practical aspects of antenna design and utilization, input impedances, structural considerations, and wave propagation. *Preq:* E C E 330, 381 or 436, MTHSC 311 or 434.

E C E 453, 653 Software Practicum 3(1,6) Students must design and implement a software system that satisfies both a requirements and specifications document. The resulting system will be tested for compliance. *Preq:* E C E 352, 417.

E C E (M E) 456, 656 Fundamentals of Robotics 3(3,0) See M E 456.

E C E 459, 659 Integrated Circuit Design 3(2,2) Design concepts and factors influencing the choice of technology; fundamental MOS device design; silicon foundries, custom and semicustom integrated circuits; computer-aided design software/hardware trends and future developments; hands-on use of CAD tools to design standard library cells; systems design considerations, testing, and packaging. *Preq:* E C E 321. *Coreq:* MTHSC 311 or 434.

E C E 460, 660 Computer-Aided Analysis and Design 3(3,0) Principles and methods suited to the solution of engineering problems on the digital computer. Topics include widely used methods for the solution of the systems of algebraic and/or differential equations which arise in modeling of engineering systems, data approximation and curve fitting, continuous system simulation languages, and design-oriented programming systems. *Preq:* E C E 262, MTHSC 311, 434, or consent of instructor.

E C E 467, 667 Introduction to Digital Signal Processing 3(3,0) Introduction to characteristics, design, and applications of discrete time systems; design of digital filters; introduction to the Fast Fourier Transform (FFT); LSI hardware for signal processing applications. *Preq:* E C E 330.

E C E 468, 668 Embedded Microprocessor 3(2,2) Interfacing, architecture, and design issues which arise when the microprocessor is embedded in electromechanical and human systems. Applications and design projects include guidance systems, robotics, process control, artificial limbs, etc. *Preq:* E C E 302 or 330 or 409 and 371, MTHSC 311 or 434 or consent of instructor.

E C E H491 Undergraduate Honors Research 1-6 Individual research projects conducted under the direct supervision and guidance of a faculty member. May be repeated for a maximum of six credits.

E C E 492, 692 Special Problems 1-3(0,2) Special assignment in electrical or computer engineering. Some typical assignments include computer programs, term papers, technical literature searches, hardware projects, and design project leadership. May be taken only once for credit.

E C E 493, 693 Selected Topics 1-3(1-3,0) Classroom study of current and new technical developments in electrical and computer engineering. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Consent of instructor.

E C E 495 Integrated System Design I 2(1,3) [O.1] Engineering design of systems is considered in a continuous process of project definition, planning, execution, and evaluation. This process includes consideration of both technical and non-technical factors in design. Strong emphasis is placed on the development of effective technical communications skills, particularly oral communications competency. *Preq:* E C E 321, 330, 360, 371, 381 (three of which must have been completed prior to enrollment, with the remaining taken as corequisite courses). *Coreq:* E C E 409 (in addition to any deficit courses in the prerequisites).

E C E 496 Integrated System Design II 2(0,6) [O.1] Project-oriented course which brings together electrical engineering students of dissimilar training into teams or project groups. Assignments are made to each group which are designed to help develop an appreciation for individual and creative thinking as well as team effort. *Preq:* E C E 321, 330, 360, 371, 381, 409, 495.

ENGINEERING

Professor: W. F. Beckwith, *Director*; *Associate Professors:* J. L. Josey, W. J. Park

ENGR 101 Introduction to Engineering 1(0,2) Introduction to the engineering profession and engineering disciplines for the purpose of assisting students in their selection of an engineering major. Professional ethics, technical communications, word processing, and electronic communications are taught.

ENGR 110 Engineering Problems Workshop 1(0,2) Workshop devoted to the analysis and solution of engineering-oriented problems. Representative problems taken from the different fields of engineering are used to illustrate such analytical and problem-solving techniques as estimation and approximation, numerical aids to computation, and solutions by graphical methods.

ENGR 120, H120 Engineering Problem Solving and Design 3(1,4) [C.1] Methodology and practice of engineering problem solving and engineering design. Selected computer tools, teamwork, and communication modes are employed. Ethics, safety, economics, and environmental concerns are considered. *Preq:* ENGR 101, MTHSC 106. *Coreq:* PHYS 122.

ENGR 150 Introduction to Materials 1(1,0) Introduction to materials used in modern technology. Different materials (metals, ceramics, and polymers) and different forms (bulk, fibers, gels, thin films, etc.) are discussed in the context of their application to consumer products, structural composites, refractories, biomedical implants, and electronic and optical materials. *Preq:* Enrollment in General Engineering or consent of instructor.

ENGR 180, H180 Computers in Engineering 3(2,3) Introduction to the use of computers in engineering analysis, design, and communications. A high-level programming language and other software are used on microcomputers. *Preq:* Engineering major; knowledge of a computer language. *Coreq:* MTHSC 106.

ENGINEERING GRAPHICS

Professor: V. B. Anand; *Lecturers:* C. A. Balch, L. C. Cleveland

E G 208 Engineering Graphics with Computer Applications 3(2,3)¹ Introduction of basic concepts in engineering graphics as a means of communication. Areas of study include theory of orthographic projections, descriptive modeling, and computer graphics. *Preq:* ENGR 180.

E G 209 Introduction to Engineering/Computer Graphics 2(1,3)¹ [C.1] Introduction of basic graphical concepts needed for engineering application, including orthographic projections, descriptive modeling, and computer graphics. *Preq:* ENGR 120 or permission of instructor.

E G 412, 612 Interactive Computer Graphics 3(3,0) Graphics hardware and display technology; reduction and presentation of engineering data; techniques of geometrical transformations, perspective, and model manipulation; methodology of computer-aided design; application of higher-level software to engineering problems. *Preq:* E G 208 and MTHSC 208 or consent of instructor.

E G 490, 690 Special Topics in Engineering and Computer Graphics 1-3(1-3,0) Comprehensive study of any computer-aided topic in engineering graphics not covered in other courses. May be repeated for a maximum of six credits. *Preq:* Consent of instructor.

¹Credit toward a degree will be given for only one of the following: E G 208, 209.

ENGINEERING MECHANICS

Professors: S. C. Anand, S. B. Biggers, R. H. Brown, E. H. Law; *Associate Professors:* P. F. Joseph, J. M. Kennedy; *Assistant Professors:* B. Han, L. L. Thompson

E M 201, H201 Engineering Mechanics: Statics 3(3,0) Forces and force systems and their external effect on bodies, principally the condition of equilibrium. The techniques of vector mathematics are employed, and the rigor of physical analysis is emphasized. *Preq:* PHYS 122, MTHSC 206 (or concurrent enrollment).

E M 202, H202 Engineering Mechanics: Dynamics 3(3,0) Continuation of E M 201. Principal topics are kinematics and kinetics of particles and rigid bodies of finite size. Techniques of vector mathematics are employed. *Preq:* E M 201, MTHSC 206.

E M 304, H304 Mechanics of Materials 3(3,0) The relationships between external loads on solid bodies or members and the resulting internal effects and dimension changes, including the derivation of rational formulas for stresses and deformations and the identification and use of important mechanical properties of engineering materials. *Preq:* E M 201, MTHSC 206.

E M 305 Mechanics of Materials Laboratory 1(0,3) Theoretical relationships considered in E M 304 are verified. Students observe the behavior under load and the failure of engineering materials; identify and evaluate mechanical properties of materials important to design and manufacturing processes; and are acquainted with various testing methods, testing machines, and instruments. *Preq:* E M 304 or C E 220, E M 201.

E M 320, H320 Fluid Mechanics 3(3,0) Behavior of fluids at rest or in motion, including the study of fluid properties. Emphasis is on a rational, analytical approach from which are developed basic principles of broad applicability to all fields of engineering. *Preq:* E M 202, M E 203 or equivalent.

E M 322 Fluid Mechanics Laboratory 1(0,3) Principles of incompressible fluid mechanics are verified and demonstrated. Familiarization with orderly techniques in organizing and reporting results of experimental investigations and with the use of instruments and equipment is afforded. *Preq:* Must be accompanied or preceded by E M 320 or C E 340.

E M 425, 625 Advanced Strength of Materials 3(3,0) Topics in strength of materials not covered in E M 304. Three-dimensional stress and strain transformations, theories of failure, shear center, unsymmetrical bending, curved beams, and energy methods. Other topics such as stress concentrations and fatigue concepts are treated as time permits. *Preq:* E M 304.

E M 430, 630 Mechanics of Composite Materials 3(3,0) Fundamental relationships for predicting the mechanical and thermal response of multilayered materials and structures are developed. Micromechanical and macromechanical relationships are developed for laminated materials with emphasis on continuous filament composites. The unique nature of composites and the advantages of designing with composites are discussed. *Preq:* E M 304.

E M 450, 650 Mechanical Vibrations 3(3,0) Mathematical analysis of physical problems in the vibration of mechanical systems. Topics include linear-free vibrations, forced vibrations, and damping in single degree of freedom systems, transient vibrations, critical speeds and whirling of rotating shafts, dynamic balancing, and multi-degree of freedom systems with lumped parameters. *Preq:* E M 202, 304, MTHSC 208.

ENGLISH

Professors: J. R. Andreas, R. E. Barfield, H. B. Bryant, F. L. Day, S. K. Eisiminger, M. J. Jacobi, G. W. Koon, R. W. Moran, R. B. Palmer, *Chair:* F. W. Shilstone, D. C. Tillinghast, C. M. Ward, D. H. Winchell, M. R. Winchell, C. H. Woodell, A. P. Young; *Associate Professors:* A. Bennett, D. G. Bzdy, W. K. Chapman, M. J. Charney, B. Daniell, K. J. H. Dettmar, S. J. Hilligoss, T. W. Howard, L. W. Rollin; *Assistant Professors:* S. M. Ashton, C. B. Boese, B. A. Clarke, B. A. Heifferon, T. G. Hill, J. M. Kuehnell, B. C. Longo, L. J. Morrissey, C. E. Paul, K. L. Schiff, E. K. Sparks; *Instructors:* J. M. Bailey, M. P. Boyer, L. R. Brown-Pressly, S. Del Collo, S. D. Devens, H. E. Evans, W. E. Edminster, S. T. Fendley, C. B. Greene, K. H. Hester, C. L. Holton, M. S. Knight, J. B. Lark, J. M. Manson, H. A. Miller, T. M. Miller, K. L. Morris, M. S. Nichols, J. A. Otto, S. I. Patel, W. A. Piper, P. A. Provost, E. C. Rice, R. D. Savage, J. C. Slate, B. D. Slattery, S. W. Walker, B. Weaver; *Lecturers:* B. J. Ramirez, S. F. Titus, M. L. Walker; *Visiting Assistant Professor:* D. Karush; *Research Associate:* C. L. Holt

ENGL 101, H101 Composition I 3(3,0) Training in correct and effective expression in brief expository essays; review of the fundamentals of grammar and punctuation; instruction in common expository methods.

ENGL 102, H102 Composition II 3(3,0) Continued emphasis on correct and effective expression; training in the organization and writing of the research report. *Preq:* ENGL 101.

ENGL 111 English as a Second Language 3(3,2) Special course for students learning English as a second language. Intensive study and drill in American English pronunciation and listening comprehension. Required of all foreign students who do not make a satisfactory grade on screening examination in oral English. To be taken Pass/Fail only. Carries no credit for graduation.

ENGL 190 The Study of English 1(1,0) Orientation to the study of English language and literature and to the sources and methods of literary research. Required of all English majors and recommended for minors.

ENGL 202, H202 The Major Forms of Literature 3(3,0) Study of the basic structures and elements of fiction, poetry, and drama, including literary and critical theory, with readings in American, British, and world literature. Proficiency in composition must be demonstrated. *Preq:* ENGL 102.

ENGL 203, H203 Survey of English Literature I 3(3,0) Chief British authors and works from Beowulf to the Romantic period. Proficiency in composition must be demonstrated. *Preq:* ENGL 102.

ENGL 204, H204 Survey of English Literature II 3(3,0) Chief British authors and works from the Romantic period to 1945. Proficiency in composition must be demonstrated. *Preq:* ENGL 102.

ENGL 205, H205 Survey of American Literature 1 3(3,0) American literature to the Civil War, with emphasis on major writers. Proficiency in composition must be demonstrated. *Preq:* ENGL 102.

ENGL 206, H206 Survey of American Literature II 3(3,0) American literature from the Civil War to 1945, with emphasis on major writers. Proficiency in composition must be demonstrated. *Preq:* ENGL 102.

ENGL 207, H207 Survey of World Literature I 3(3,0) Translations of continental European literature from Homer to the Renaissance (together with some Asian classics), with emphasis on major authors. Proficiency in composition must be demonstrated. *Preq:* ENGL 102.

ENGL 208, H208 Survey of World Literature II 3(3,0) Translations of continental European literature from the 17th century to the present (together with some Asian classics), with emphasis on major writers. Proficiency in composition must be demonstrated. *Preq:* ENGL 102.

ENGL 209, H209 Contemporary Literature 3(3,0) Study of selected writers since 1945, primarily British and American. Proficiency in composition must be demonstrated. *Preq:* ENGL 102.

ENGL H210 Introduction to Literary Study 3(3,0) Literature and composition course for honors students who have exempted ENGL 101 and 102. Readings in American, English, and world literature and advanced training in writing and research. *Preq:* Exemption from ENGL 101 and 102 or consent of the instructor.

ENGL 217 Vocabulary Building 3(3,0) Development of a useful discriminating vocabulary for writing, speaking, and reading. Student notebooks and proficiency quizzes. *Preq:* ENGL 102.

ENGL 231 Introduction to Journalism 3(3,0) Instruction and practice in writing for mass media; editorial responsibilities. *Preq:* ENGL 102.

ENGL (G W) 301 Great Books of the Western World 3(3,0) See G W 301.

ENGL 304 Business Writing 3(3,0) [W.3] Introduction to business writing: memoranda, letters, reports, and research methods. *Preq:* Junior standing.

ENGL 312 Advanced Expository Writing 3(3,0) [W.3] Workshop in practical writing focusing on principles and style. *Preq:* Sophomore literature or consent of instructor.

ENGL 314, H314 Technical Writing 3(3,0) [W.3] Intensive training in the fundamentals of technical writing: reports, letters, and memoranda. *Preq:* Junior standing.

ENGL 316 Writing and International Trade 3(3,0) [W.3] Students complete projects demanding a variety of communications skills that professionals in international trade need; sensitivity to foreign audiences and cultures in oral and written communication, electronic and graphic communication, collaborative writing and management. *Preq:* Sophomore literature.

ENGL 331 Publications Workshop 1(1,0) Workshop designed for students who serve on student publication staffs. Emphasizes the responsibilities of staff members. May be repeated for a maximum of three credits. *Preq:* ENGL 102 and consent of the instructor.

ENGL 333 Reporting for the News Media 3(3,0) [W.3] Practical experience in gathering and writing news and feature copy for the media, concentration on print journalism; examination of the role of the modern journalist; laws governing the profession; journalistic ethics. *Preq:* ENGL 231 or consent of instructor.

ENGL 334 Feature Writing 3(3,0) [W.3] Practical experience in writing feature articles for newspapers, magazines, and free-lance markets. *Preq:* ENGL 231 or consent of instructor.

ENGL 335 Editing for Newspapers 3(3,0) Examination of the editing process of newspapers and magazines. Practical experience in article selection, copy-editing, headline writing, and page design. *Preq:* ENGL 231 or consent of instructor.

ENGL 345 The Structure of Fiction 3(3,0) [W.3] Introduction to the creative writing and critical study of prose fiction. *Preq:* Sophomore literature or consent of instructor.

ENGL 346 The Structure of Poetry 3(3,0) [W.3] Introduction to the creative writing and critical study of poetry. *Preq:* Sophomore literature or consent of instructor.

ENGL (THEA) 347 The Structure of Drama 3(3,0) See THEA 347.

ENGL 348 The Structure of the Screenplay 3(3,0) Introduction to the creative writing and critical study of the screenplay. Screenplays vary from semester to semester. May be repeated once for credit with consent of instructor. *Preq:* ENGL 357 or consent of instructor.

- ENGL 350 Mythology 3(3,0)** Study of the great myths of the world with an emphasis on their applications to literature. *Preq:* Sophomore standing.
- ENGL 351 American Folklore 3(3,0)** Study of American folklore with an emphasis on such considerations as the folktale, folk songs and ballads, folk heroes, and folk superstitions and remedies. *Preq:* Sophomore standing.
- ENGL 353 Ethnic American Literature 3(3,0)** Critical examination of essays, poetry, fiction, and drama written by members of a variety of American racial and ethnic groups, such as Native Americans, African-Americans, Chicano/Mexican Americans, Asian Americans, Italian Americans, and American Jews. *Preq:* Sophomore standing.
- ENGL 355 Popular Culture 3(3,0)** Examination of the nature, functions, history, and impact upon American society of best sellers, popular magazines, television, movies, and other like phenomena. *Preq:* Sophomore standing.
- ENGL 356 Science Fiction 3(3,0)** Readings in science fiction from the 17th century to the present, with special emphasis on writers since Verne and Wells. *Preq:* Sophomore standing.
- ENGL 357 Film 3(2,3)** Examination of the film medium as an art form: its history, how films are made, why certain types of films (western, horror movies, and so forth) have become popular, and how critical theories provide standards for judging film. *Preq:* Sophomore standing or consent of instructor.
- ENGL 358 Advanced Studies in Film 3(2,3)** Continued study of film theory and aesthetics, with applications of that knowledge to the making of a film or video. *Preq:* ENGL 357 or consent of instructor.
- ENGL 359 Special Topics in Language, Literature, or Culture 3(3,0)** Studies in varied topics not central to other English courses, such as Literature and Art/Business/Sports; Language and Style; Black Literature. Specific titles and course descriptions to be announced from semester to semester. May be repeated once with department chair's consent. *Preq:* Sophomore literature or consent of instructor.
- ENGL H367 Special Topics for Honors Students 3(3,0)** Varied topics of general interest in literature, language, rhetoric, or culture for all honors students. Specific topics announced from semester to semester. May be repeated for a maximum of nine credits. *Preq:* Sophomore literature.
- ENGL 380 British and American Women Writers 3(3,0)** Poetry, drama, fiction, and prose by established and little-known women writers in Britain and America. Particular attention to works treating themes and issues concerning women's lives. Readings on such topics as women and work, education, religion, creativity. *Preq:* Sophomore standing.
- ENGL 385 Children's Literature 3(3,0)** Reading and analysis in a wide range of authors, illustrators, and genres appropriate for children from preschool through eighth grade, classic as well as modern. Critical approaches include historical, thematic, and social. *Preq:* Sophomore standing.
- ENGL 386 Adolescent Literature 3(3,0) [W.1]** Reading and analysis of literature written for readers age 12-18. Emphasis on historical context, chief themes and motifs, and censorship issues, as well as connections with classic literature. *Preq:* Sophomore standing.
- ENGL 400, 600 The English Language 3(3,0)** Studies in English usage and historical development of the language. *Preq:* Sophomore literature.
- ENGL 401, 601 Grammar Survey 3(3,0)** Survey of modern grammars with a focus on exploring the impact structural grammar has had on traditional grammar. Recommended for English teachers. *Preq:* Sophomore literature.
- ENGL 403, 603 The Classics in Translation 3(3,0)** Examination of Homer's *Iliad* and *Odyssey*, Virgil's *Aeneid*, and Ovid's *Metamorphoses*. A few shorter works by other Greek and Roman writers may also be read. *Preq:* Sophomore literature.
- ENGL 404, 604 Classical Drama 3(3,0)** Selected reading in the dramatic literature of classical Greece and Rome. *Preq:* Sophomore literature.
- ENGL 405, 605 Studies in English Literature to 1700 3(3,0)** Selected reading in English literature from the beginnings to 1700, with emphasis on social and intellectual backgrounds. *Preq:* Sophomore literature.
- ENGL 406, 606 Studies in English Literature Since 1700 3(3,0)** Selected readings in English literature from 1700 to the present, with emphasis on social and intellectual backgrounds. *Preq:* Sophomore literature.
- ENGL 407, 607 The Medieval Period 3(3,0)** Selected works of Old and Middle English literature, exclusive of Chaucer. *Preq:* Sophomore literature.
- ENGL 408, 608 Chaucer 3(3,0)** Selected readings in Middle English from *The Canterbury Tales* and other works by Chaucer. *Preq:* Sophomore literature.
- ENGL 409, 609 The Earlier English Renaissance 3(3,0)** Tudor and Elizabethan poetry, prose, fiction, translations, essays, and criticism. *Preq:* Sophomore literature.
- ENGL 410, 610 Drama of English Renaissance 3(3,0)** Selected readings in non-Shakespearean dramatic literature of the 16th and 17th centuries. *Preq:* Sophomore literature.
- ENGL 411, 611 Shakespeare 3(3,0)** Study of selected tragedies, comedies, and history plays of Shakespeare. Required of all English majors. *Preq:* Sophomore literature.
- ENGL 412, 612 Studies in Shakespeare 3(3,0)** Special topics in Shakespeare as selected by instructors. May be repeated once with department chair's consent. *Preq:* Sophomore literature.
- ENGL 413, 613 Later English Renaissance 3(3,0)** Nondramatic poetry and prose from Ben Jonson, John Donne, and Francis Bacon through Andrew Marvell and John Bunyan, excluding Shakespeare and Milton. *Preq:* Sophomore literature.
- ENGL 414, 614 Milton 3(3,0)** Development of Milton's art and thought from the minor poems and selected prose through *Paradise Lost*, *Paradise Regained*, and *Samson Agonistes*, set against the background of the late Renaissance. *Preq:* Sophomore literature.
- ENGL 415, 615 The Restoration and Eighteenth Century 3(3,0)** Readings in Dryden, Swift, Pope, and Dr. Johnson. *Preq:* Sophomore literature.
- ENGL 416, 616 The Romantic Period 3(3,0)** Readings from the poetry and critical prose of Blake, Wordsworth, Coleridge, Byron, Shelley, Keats, and other representative figures. *Preq:* Sophomore literature.
- ENGL 417, 617 The Victorian Period 3(3,0)** Reading from the poetry and nonfiction prose of selected Victorian authors, including works of Carlyle, Tennyson, Browning, Arnold, and other representative figures. *Preq:* Sophomore literature.
- ENGL 418, 618 The English Novel 3(3,0)** Study of the English novel from its 18th century beginnings through the Victorian Period. *Preq:* Sophomore literature.
- ENGL 422, 622 American Literature I 3(3,0)** Major American authors and movements from the Colonial period to the Civil War. *Preq:* Sophomore literature.
- ENGL 423, 623 American Literature II 3(3,0)** Major American authors and movements from the Civil War to the early 20th century. *Preq:* Sophomore literature.
- ENGL 424, 624 American Literature III 3(3,0)** Major American authors and movements of the 20th century. *Preq:* Sophomore literature.
- ENGL 425, 625 The American Novel 3(3,0)** Survey of the most significant forms and themes of the American novel from its beginnings to 1900. *Preq:* Sophomore literature.
- ENGL 426, 626 Southern Literature 3(3,0)** Intellectual and literary achievement of the South from 1607 to the present, with emphasis on the writers of the 19th century. *Preq:* Sophomore literature.
- ENGL 430, 630 Modern Drama 3(3,0)** Principles and progress of drama from Ibsen to the present; analysis of representative plays; critical reports; discussion of trends in contemporary drama. *Preq:* Sophomore literature.
- ENGL 431, 631 Modern Poetry 3(3,0)** The modern tradition in English and American poetry from Yeats to the present; relevant critical essays. *Preq:* Sophomore literature.
- ENGL 432, 632 Modern Fiction 3(3,0)** American and British novels and short stories of the 20th century. *Preq:* Sophomore literature.
- ENGL 433, 633 The Anglo-Irish Literary Tradition 3(3,0)** Exploration of the unique literary heritage and achievement of English-language Irish writers in the 19th and 20th centuries. Major figures of the Irish tradition: W. B. Yeats, James Joyce, and Samuel Beckett, and other writers; consideration of the specifically Irish aspects of their works. *Preq:* Sophomore literature.
- ENGL 434, 634 Environmental Literature 3(3,0)** Survey of literature that examines the relationship between human beings and the natural world, including analysis of environmental themes in myths and legends and in selected poetry and prose of nineteenth- and twentieth-century England and America. *Preq:* Sophomore literature or consent of instructor.

ENGL 435, 635 Literary Criticism 3(3,0) Major critical approaches to literature. *Prq:* Sophomore literature.

ENGL 436, 636 Feminist Literary Criticism 3(3,0) Introduction to the germinal works of feminist literary theory and criticism. Outlines the development of modern literary criticism by studying feminist versions of the major critical methodologies. *Prq:* Sophomore literature or consent of instructor.

ENGL 437, 637 Directed Studies 1-3(1-3,0) Class and tutorial work for students with special interests or projects in American, British, or European literature outside the scope of existing courses. Applications must be approved during the early registration period of the semester preceding the one in which directed studies will occur. May be repeated by arrangement with the department. *Prq:* Junior standing and approved registration.

ENGL H438 Departmental Honors Research 3(3,0) Research for the preparation of an honors project. *Prq:* Second-semester Junior standing and the approval of the English Honors Committee.

ENGL H439 Departmental Honors Project 3(3,0) Preparation of an honors project. *Prq:* ENGL H438 and first semester Senior standing.

ENGL 445, 645 Fiction Workshop 3(3,0) Workshop in the creative writing of prose fiction. May be repeated once for credit. *Prq:* ENGL 345 or consent of instructor.

ENGL 446, 646 Poetry Workshop 3(3,0) Workshop in the creative writing of poetry. May be repeated once for credit. *Prq:* ENGL 346 or consent of instructor.

ENGL (THEA) 447, 647 Playwriting Workshop 3(0,3) See THEA 447.

ENGL 448 Screenwriting Workshop 3(3,0) Workshop in the creative writing of screenplays. May be repeated once for credit. *Prq:* ENGL 348 or consent of instructor.

ENGL 450, 650 Film Genres 3(2,3) Advanced study of films that have similar subjects, themes, and techniques, including such genres as the Western, horror, gangster, science fiction, musical, and/or screwball comedy. Also considers non-traditional genres, screen irony, genre theory, and historical evolution of genres. Topics vary. *Prq:* ENGL 357 or consent of instructor.

ENGL 451, 651 Film Theory and Criticism 3(2,3) Advanced study into the theory of film/video making with an emphasis on understanding a variety of critical methods to approach a film. Examines the history of film theory and defines the many schools of film criticism, including realism, formalism, feminism, semiotics, Marxism, and expressionism. *Prq:* ENGL 357 or consent of instructor.

ENGL 452, 652 Great Directors 3(2,3) Intensive study of one to three film directors with an emphasis on understanding the entire canon of each director. Students study similarities in techniques, shifts in thematic emphasis, and critical methodologies for approaching the works of each director. Topics vary. *Prq:* ENGL 357 or consent of instructor.

ENGL 453, 653 Sexuality and the Cinema 3(2,3) Examination of male/female sexual roles and their evolution in American genre films, avant-garde

cinema, and international films. Includes the study of movies in relation to cultural values and social stereotypes, introduction to feminist film theory, and consideration of film pornography. *Prq:* ENGL 357 or consent of instructor.

ENGL (LANG) 454 Selected Topics in International Film 3(2,3) See LANG 454.

ENGL 455, 655 American Humor 3(3,0) Native American humor of the 19th and 20th centuries. *Prq:* Sophomore literature.

ENGL (HUM) 456 Literature and Arts of the Holocaust 3(3,0) Addresses the Holocaust through literature, art, architecture, music, and film. Beginning with historical, political, and economic forces that contributed to the Holocaust, course then focuses on highly diverse creative responses to this event—responses that often reflect the difficulties and politics of these commemorative gestures. *Prq:* Sophomore literature or consent of the instructor.

ENGL 459, 659 Advanced Special Topics in Language, Literature, or Culture 3(3,0) Advanced studies in topics not central to other English courses, such as certain authors, works, genres, themes, or areas of knowledge and culture. Specific topics will be announced when offered. May be repeated once for credit with department chair's consent. *Prq:* Sophomore literature.

ENGL 475 Writing for Electronic Media 3(3,0) Hands-on workshop in new forms of writing and hypertextual design for interactive electronic media. May be repeated once for credit. *Prq:* Sophomore literature or consent of instructor.

ENGL 482, 682 African American Fiction and Nonfiction 3(3,0) Critical examination of the various forms and genres of African American prose including the novel, short fiction, autobiography, nonfiction, and oratory with some attention to emerging theories about African American culture and its impact on American cultural life in general. *Prq:* Sophomore literature.

ENGL 483, 683 African American Poetry, Drama, and Film 3(3,0) Studies in the various forms, themes, and genres of African American poetry, drama, and film with some attention to emerging theories about African American culture and its impact on American cultural life in general. *Prq:* Sophomore literature.

ENGL 485, 685 Composition for Teachers 3(3,0) Practical training in teaching composition: finding workable topics, organizing and developing observations and ideas, evaluating themes, and creative writing. *Prq:* Sophomore literature.

ENGL 490, 690 Advanced Technical and Business Writing 3(3,0) Advanced work in writing proposals, manuals, reports, and publishable articles. Students produce work individually and in groups. *Prq:* ENGL 304 or 314 or consent of instructor.

ENGL (SPCH) 491, 691 Classical Rhetoric 3(3,0) Study of the major texts in classical rhetoric. Examines the nature and functions of rhetoric in Greek and Roman societies. Traces the development of rhetoric from Protagoras through Isocrates, Plato, Aristotle, Cicero, and Quintilian, and considers questions essential to understanding persuasive theory and practices. *Prq:* Sophomore literature or consent of instructor.

ENGL (SPCH) 492, 692 Modern Rhetoric 3(3,0) Examines the "new rhetorics" of the 20th century, which are grounded in classical rhetoric but which include findings from biology, psychology, linguistics, and anthropology, among other disciplines. Considers the theories and applications of communication. *Prq:* Sophomore literature or consent of instructor.

ENGL 494 Writing About Science 3(3,0) Advanced work in scientific writing and editing for peer and lay audiences. *Prq:* ENGL 304, 314, or consent of instructor.

ENGL 495, 695 Technical Editing 3(3,0) Practical experience in editing and preparing technical manuscripts for publication. General introduction to the functions of the technical editor. *Prq:* ENGL 304, 314, or consent of instructor.

ENTOMOLOGY

Professors: P.H. Adler, D.R. Alverson, T.M. Brown, G.R. Carner, J.D. Culin, C.S. Gorsuch, R.P. Griffin, P.M. Horton, *Chair*, J.C. Moore, P.A. Zungoli; *Associate Professor:* W.M. Hood

ENT 200 Insects 2(2,0) Introduction to insects; their various relationships with man, other animals and plants. The general nature of this course makes it beneficial to all students regardless of specialty. Closed to students who have had ENT 301 or equivalent.

ENT 201 Current Topics in Entomology 1(1,0) Discussion course covering topics dealing with insects and related arthropods. Subjects are chosen to reflect issues of current interest as well as those having significance in human history. May be repeated for a maximum of three credits.

ENT 300 Environmental Entomology 3(3,0)S Exploration of the diversity and roles of insects in natural and affected environments, the impact of insects and pesticides on environmental quality, and discussion of environmental ethics in entomological science. *Prq:* Any biological or physical science.

ENT 301 General Entomology 4(3,3) Introduction to the study of insects, with emphasis on their structure, function, ecology, and behavior. Identification of commonly encountered species is highlighted. Relationships between insect and human populations are discussed. Control technologies are introduced, with emphasis on environmentally responsible tactics.

ENT 305 Presentation of Scientific Information 3(2,2) [O.2]F Instruction and practice in delivering oral presentations of scientific information and preparing visual aids. Emphasis is on oral scientific presentations for various target groups including scientists, service technicians, growers, amateur enthusiasts, the general public, and other audiences in which scientific information is transferred.

ENT 308 Apiculture 3(2,3)S Even-numbered years. Detailed study of the honey bee and its economic importance in pollination and honey production. Attention is given to bee behavior, colony management, equipment, honey-plant identification, and honey production and processing. *Prq:* BIOL 104 and consent of instructor.

ENT 401, H401, 601 Insect Pests of Ornamental Plants and Shade Trees 3(2,3)F Odd-numbered years. Recognition, biology, damage, and control of insect pests of woody and other ornamental plants and shade trees. *Prq:* ENT 301.

ENT 404, H404, 604 Urban Entomology 3(2,3)F Even-numbered years. Study of pests common to the urban environment with emphasis on biology, damage, control, and identification of household, structural, stored products, and food pests. Students learn both theoretical and practical aspects of urban pest management and the pest-control industry. *Prq:* ENT 301.

ENT 405, H405, 605 Insect Morphology 4(3,3)F Even-numbered years. Study of insect structure in relation to function and of the variation of form in insects. *Prq:* ENT 301.

ENT (PL PA) 406, H406, 606 Diseases of Insects and Turfgrasses 3(2,2)F See PL PA 406.

ENT 407, 607 Applied Agricultural Entomology 4(3,3)F Even numbered years. Topics covered are the recognition, biology, damage, and control of economically important insects and mites found on major Southeastern field, fruit, nut, and vegetable crops. The principles and practices of crop protection, including pesticide application, economic basis for decision making, and development of scouting programs are introduced. *Prq:* ENT 301 or equivalent.

ENT 410, 610 Insect Taxonomy 3(1,6)S Odd-numbered years. The identification of the principal families of the major orders of adult insects. Laboratory work consists of intensive practice of such identification; lecture material deals with theoretical discussion of taxonomic features observed in the laboratory. *Prq:* ENT 405 or consent of instructor.

ENT 412, 612 Field and Museum Entomology 3(0,9)SS Practical aspects of gathering, sorting, and curating insects. Students participate in intensive overnight insect-collecting expeditions to various parts of the Southeastern United States, becoming acquainted with insect habitats and collecting methods. Remainder of the summer session is devoted to training in specimen preparation and preservation. *Prq:* Consent of instructor.

ENT 420, 620 Toxicology of Insecticides 3(2,3)S Odd-numbered years. Concepts of insecticide toxicology; principles of insecticide action; toxicological and pharmacological effects in insects and higher animals, safety, current regulations governing the use of insecticides. *Prq:* ENT 301.

ENT (ENTO) 430, 630 Toxicology 3(3,0)F Odd-numbered years. Basic principles of toxicology including quantitation of toxicity, toxicokinetics, biochemical action of poisons, and environmental toxicology are studied. Acute and chronic effects of various classes of poisons (e.g., pesticides, drugs, metals, and industrial pollutants) are discussed in relation to typical routes of exposure and regulatory testing methods. *Prq:* Organic Chemistry, one year of general biology, or consent of instructor.

ENT 440, 640 Insect Behavior 3(2,3)F Odd-numbered years. Fundamentals of insect behavior in an evolutionary and ecological perspective. Laboratories emphasize generation and testing of

hypotheses and observation, description, and quantification of insect behavior. *Prq:* ENT 301 or consent of instructor.

ENT 455, H455, 655 Medical and Veterinary Entomology 3(2,3)F Odd-numbered years. Insects and their arthropod relatives which are of economic importance in their effect on man and animals. *Prq:* ENT 301 or consent of instructor.

ENT 461 Directed Research in Entomology 1-3(0,3,9) Development of a senior thesis based on a research problem in a selected entomological area. Emphasis is on integrating the knowledge gained in the student's program with the results of the research project. May be repeated for a maximum of three credits. *Prq:* Senior standing and consent of instructor.

ENT 462, 662 Seminar Presentation 1(1,0) [O.1] Advanced instruction and practice in delivering oral seminar presentations of scientific information. Emphasis is on preparing visual aids, organization, content, and practice in speaking to a specialized scientific audience.

ENT (W F B) 469, H469, 669 Aquatic Insects 3(1,6)S Odd-numbered years. Identification, life history, habitats, and interrelationships of aquatic insects; techniques of qualitative field collecting; important literature and research workers. *Prq:* ENT 301 or consent of instructor.

ENT 490 Practicum 1-4 Supervised entomological learning opportunity providing highly individualized experiences to complement other programs and courses. Must be prearranged at least two months in advance. Must file written report midway during enrollment period and at its conclusion. Must appear for oral evaluation at the end of the period. *Prq:* Junior standing and consent of instructor.

ENT (GEN) 495, 695 Insect Biotechnology 3(3,0)S Odd-numbered years. Considers many unique genetic features exhibited by insects and describes the applications of biotechnology to enhance useful products from insects and to affect the control of destructive insects. *Prq:* ENT 301, GEN 302.

ENVIRONMENTAL ENGINEERING AND SCIENCE

Professors: A. W. Elzerman, *Chair*; R. A. Field, C. P. L. Grady, T. M. Keinath, F. J. Molz, T. J. Overcamp; *Associate Professor:* R. W. Falt; *Assistant Professors:* T. A. DeVol, R. D. L. Freedman, T. Karanfil, C. M. Lee, L. Murdoch; *Research Associates:* M. C. Boufadel, J. T. Coates, Jr.

EE&S 401, 601 Environmental Engineering 3(3,0) Introduction to the field of environmental engineering. Topics include environmental phenomena, impact of pollutants in the aquatic environment, solid-waste management, air pollution control, radiological health, and simple water and wastewater treatment systems. *Prq:* Junior standing in engineering or consent of instructor. *Coreq:* E M 320 or consent of instructor.

EE&S 402, 602 Water and Waste Treatment Systems 3(3,0) Study of the fundamental principles, rational design considerations, and operational procedures of the unit operations and processes

employed in water and waste treatment. Both physiochemical and biological treatment techniques will be discussed. Introduction to the integration of unit operations and processes into water and waste treatment systems. *Prq:* E M 320 or consent of instructor.

EE&S 410, 610 Environmental Radiation Protection 1 3(3,0) Fundamental principles of radiological health and radiation safety. Topics include radiation fundamentals, basic concepts of environmental radiation protection, internal and external dosimetry, environmental dose calculations and radiation protection standards. *Prq:* Consent of instructor.

EE&S 411, 611 Ionizing Radiation Detection and Measurement 3(2,3) Laboratory exercises in ionizing radiation detection and measurements. Topics include nuclear electronics; counting statistics; radiation interactions; basic gas, scintillation, and semiconductor detectors; gamma-ray spectroscopy; health physics survey instrumentation; and thermoluminescent dosimetry. *Prq:* EE&S 410 or consent of instructor.

EE&S 430, 630 Air Pollution Engineering 3(3,0) Introductory course in air pollution and its control. Topics include air pollutants and effects, sources, dispersion models, engineering controls, and air-quality legislation. *Prq:* Senior standing in engineering or physical sciences.

EE&S (B E, FOR) 451, H451, 651 Newman Seminar and Lecture Series in Natural Resources Engineering 1(0,2) See B E 451.

EE&S 480, 680 Environmental Risk Assessment 3(3,0) Quantitative estimation of the human health risk posed by the release of a contaminant to the environment. Topics include methods for analyzing emission rate, environmental transport, exposure, and health effects; methods of uncertainty analysis; and the role of risk assessment in environmental regulation and environmental decision making. *Prq:* EE&S 401 or consent of instructor.

EE&S (B E, I E) 484, 684 Municipal Solid Waste Management 3(3,0) Introduction to the problems, regulations, collection, handling, recycling, and disposal of municipal solid wastes in the urban and rural sectors. Emphasis is on an integrated waste-management system with resource recovery, composting, incineration, landfill disposals and their costs. *Prq:* Senior standing in engineering or science or consent of instructor.

EE&S 485, 685 Hazardous Waste Management 3(3,0) Introduction to the problems, regulations, treatment, and ultimate disposal of hazardous and toxic materials. Spill cleanup, groundwater transport, land disposal, incineration, and treatment technologies are discussed. *Prq:* EN SP 200 or EE&S 401 or permission of instructor; two semesters of general chemistry.

EE&S 491 Selected Topics in Environmental Engineering 1-3 Study of the dynamic role of environmental engineering in maintaining environmental quality. A comprehensive study of any phase of environmental engineering. *Prq:* Consent of department chair.

ENVIRONMENTAL SCIENCE AND POLICY

Professors: A. W. Elzerman, *Coordinator*; R. E. Franklin, W. H. Leonard, E. M. Murrow, J. E. Schindler, T. B. Yandle, Jr.; *Associate Professors:* L. D. Fredendall, J. B. London, W. F. Steirer, J. R. Wagner

EN SP 200 Introduction to Environmental Science 3(3,0) Basic principles of environmental science including ecology, energy, resources, waste management; and air, water, and soil pollution. Consideration of issues, specific cases, investigative approaches and remedial actions. *Preq:* Sophomore standing and either two semesters of freshman chemistry or biology.

EN SP (AGRIC) 315, H315 Environment and Agriculture 3(3,0) See AGRIC 315.

EN SP 400 Studies in Environmental Science 3(3,0) Study of historical perspectives, attitudes, and government policy within the framework of environmental case studies to illustrate the interaction between human and natural factors as they mutually affect the environment and man's ability to deal with that environment. *Preq:* EN SP 200 or consent of instructor.

EN SP 431, 631 Public Health Administration 3(3,0) Prepares students for careers in the environmental sciences, with positions in public health and pollution control. Topics include public health organizations and regulations, public relations, psychology of public health administration, and the use of the communications media in educating the public on health problems.

EN SP 432 Inspection Methods in Water and Solid Waste 3(2,3) Methods of disposal of liquid and solid wastes are emphasized in regard to environmental quality control. Treatment plant methods are discussed. Inspection techniques for adequate treatment is a basic approach.

EN SP 471, 671 Man and His Environment 2(2,0) The interaction of man with his environment is surveyed. Factors such as urbanization, population growth, pathogens, disease vectors, ionizing radiation, sewage disposal, and noise control are considered. Effects of environmental contacts with air, water, food, and solid and liquid wastes are emphasized. *Preq:* Consent of instructor.

EN SP 472, 672 Environmental Planning and Control 2(2,0) Application of planning and control to effective environmental quality improvement. Water supply and treatment, wastewater treatment and disposal, solid waste disposal, air pollution abatement, and land use and zoning are considered from the standpoint of control. Not intended for graduate students in engineering. *Preq:* Consent of instructor.

ENVIRONMENTAL TOXICOLOGY

Professors: R. J. Kendall, S. J. Klaine

ENTOX 400, H400, 600 Wildlife Toxicology 3(3,0) Assessment of impacts of toxic substances on reproduction, health, and well-being of wildlife species; acute and chronic effects of agricultural chemicals, pesticides, hazardous waste, indus-

trial waste, and oil releases are discussed. *Preq:* BLOCH 210 or organic chemistry, one year of general biology, W F B 350 or consent of instructor.

ENTOX 421, H421, 621 Chemical Sources and Fate in Environmental Systems 3(3,0) Chemical cycles in the environment are discussed on global and microcosm scales. The dependence of fate processes on physical and chemical properties and environmental conditions is examined. Breakdown, movement, and transport of selected toxicants are addressed to illustrate the mechanisms that govern chemical fate. *Preq:* Organic and analytical chemistry or consent of instructor.

ENTOX (ENT) 430, 630 Toxicology 3(3,0)F See ENT 430.

EXECUTIVE LEADERSHIP AND ENTREPRENEURSHIP

E L E 301 Executive Leadership and Entrepreneurship I 3(2,3) Comprehensive, cross-disciplinary fundamentals of entrepreneurship and executive leadership. Team taught by faculty from various disciplines. *Preq:* Sophomore standing, nomination and selection by faculty.

E L E 401 Executive Leadership and Entrepreneurship II 3(2,3) Comprehensive, cross-disciplinary fundamentals of entrepreneurship and executive leadership. Case studies of business success and failures. Continuation of E L E 301. *Preq:* E L E 301.

E L E 499 Executive Leadership and Entrepreneurship III 3-6(1-3,6-12) Directed practical study of entrepreneurship and leadership. Continuation of E L E 301 and 401. Students work closely with external infant firms to develop new products and bring existing products to market successfully. *Preq:* E L E 401.

EXPERIMENTAL STATISTICS

Professors: W. C. Bridges, Jr., P. M. Burrows, L. W. Grimes, H. S. Hill, Jr., *Chair*; J. E. Toler, *Associate Professor*; J. R. Rieck, *Lecturer*; R. M. Martinez-Dawson

EX ST 301, H301 Introductory Statistics 3(2,2) Basic concepts and methods of statistical inference; organization and presentation of data, elementary probability, measures of central tendency and variation, tests of significance, sampling, simple linear regression and correlation. The role of statistics in interpreting research and the general application of the methods are stressed. Credit will be given toward graduation for only one of the following: EX ST 301, MTHSC 301, 302.

EX ST 411, 611 Statistical Methods for Process Development and Control 3(3,0) Experimental design techniques for use in process development, application of screening experiments and response surface experiments, techniques for process control with implications for product quality control. Includes discussions of the use of statistical computer analyses and interpretations including computer generated graphics. *Preq:* MTHSC 206 or consent of instructor.

EX ST 462, 662 Statistics Applied to Economics 3(3,0) Continuation of EX ST 301 with emphasis on statistical methods used in the collection,

analysis, presentation, and interpretation of economic data. Special attention is given to time series analysis, the construction of index numbers, and the designing of samples for surveys in the social science fields. *Preq:* EX ST 301.

FINANCE

Professors: M. F. Spivey, N. G. Waller; *Associate Professors:* J. C. Alexander, Jr., S. W. Barnhart, J. M. Harris, Jr., Y. C. Kim, R. H. Klein, R. B. McElreath, Jr., *Chair*; *Assistant Professor:* J. M. Miller

FIN 301 Personal Finance 3(3,0) Analysis of the preparations of personal financial plans. Topics include savings and budgeting, personal taxes, housing and automobile decisions, loans, insurance needs, investments, and retirement needs. Cannot be counted towards a degree in Financial Management.

FIN 304 Risk and Insurance 3(3,0) Studies the nature of risk and the role of insurance in risk management from individual and business viewpoints. Topics include probability, theory of the firm under uncertainty, insurance carriers and contracts, underwriting, and regulation. *Preq:* ECON 200, 211, or consent of instructor.

FIN 305 Investment Analysis 3(3,0) Study of techniques useful in analyzing alternative investment opportunities with emphasis on corporate securities. Investment planning and portfolio management are considered. *Preq:* FIN 306 or 311 or consent of instructor.

FIN 306 Corporation Finance 3(3,0) Introduction to financial management of nonfinancial firms. Includes such topics as analysis of financial statements, financial forecasting, capital budgeting, working capital management, and long-term financing decisions. Credit may not be received for both FIN 306 and 311. *Preq:* ACCT 202 or 203 or consent of instructor.

FIN 307 Principles of Real Estate 3(3,0) Acquaints the student with the theories, practices, and principles which govern real estate markets. Major emphasis is on (1) specifics of real estate brokerage, property rights and ownership; (2) making real estate investment decisions; and (3) financing real estate investments. *Coreq:* FIN 306 or 311 or consent of instructor.

FIN 308 Financial Institutions and Markets 3(3,0) Study of the various types of financial institutions and of topics critical to the financial institutions practitioner. Topics include financial regulations, financial security types and their yields, interest rate risk management, foreign currency risks management, and stock index futures. *Preq:* FIN 306 or 311 or consent of instructor.

FIN 311, H311 Financial Management I 3(3,0) First of a two-course sequence to provide in-depth exposure to the theory and practice of corporate financial management and to demonstrate how financial management techniques are applied in decision making. Credit cannot be received for both FIN 306 and 311. *Preq:* ACCT 202 and MTHSC 203 or 301.

FIN 312, H312 Financial Management II 3(3,0) Continuation of the two-course sequence that begins with FIN 311. *Preq:* Fin 311 or 306 with approval of a Finance Department advisor.

FIN 399 Finance Internship 1-3(1-3,0) Pre-planned, preapproved, faculty-supervised internships to give students on-the-job learning in support of classroom education. Internships must be no less than six full-time, consecutive weeks with the same internship provider. Restricted to students with a major of minor in Financial Management. To be taken Pass/Fail only. *Prq:* Consent of instructor.

FIN 402, H402 Managing Business Assets 3(3,0) Study of the decision process and analytical techniques used in evaluating corporate investment decisions, including both long-term capital investments and working capital management. Computer-based financial decision making will be used. *Prq:* FIN 312 or consent of instructor.

FIN 404, H404 Financing of Businesses 3(3,0) Financial policy, theory, and cases dealing with the use of debt financing, dividend policy, convertible securities, mergers and acquisitions, leasing, and special topics. *Prq:* FIN 312 or consent of instructor.

FIN 405, 605 Portfolio Management and Theory 3(3,0) Introduction to portfolio management. Includes the underlying theory, managing the equity and the fixed-income portfolios, portfolio evaluation, options-pricing theory, future markets and instruments. *Prq:* FIN 305 and either 306 or 311; or consent of instructor.

FIN 406, 606 Analysis and Use of Derivatives 3(3,0) Consideration of the option pricing theory and strategy techniques most commonly used in the market for options. An overview of the futures markets is also considered. Special emphasis is given to interest-rate futures, stock-index futures, and foreign-exchange futures. *Prq:* FIN 305 or consent of instructor.

FIN 408 Management of Financial Institutions 3(3,0) Detailed study of the operational, marketing, and regulatory aspects of the management of depository financial institutions. Emphasis is on decision making through the extensive use of cases. *Prq:* FIN 308.

FIN 409 Professional Financial Planning 3(3,0) Concepts and practical implementation of professional financial planning, with focus on essentials of budgeting and saving, risk management, tax planning, investment planning, and retirement and estate planning. Emphasis is on integrating these elements into a comprehensive personal financial plan. *Prq:* ACCT 404, FIN 305.

FIN 410, H410, 610 Research in Finance 1-3 Directed research course for students interested in a career in finance. Research topic selected by student and approved by instructor. A formal research paper is required. *Prq:* FIN 306 or 312 and consent of instructor.

FIN 411 International Financial Management 3(3,0) Extension of the principles of finance to the international context. Focuses on the implications of the existence of multiple currencies and the operations across borders of sovereign nation-states for the multinational corporation. *Prq:* FIN 306 or 311 or consent of instructor.

FIN 415, 615 Real Estate Investment 3(3,0) Focuses on the structure and analysis of real estate investment emphasizing financial theory and analysis technique. Case study and project-oriented

homework assignments facilitate the understanding of real estate investments. *Prq:* FIN 307 and 306 or 311.

FIN 417, 617 Real Estate Finance 3(3,0) Advanced course applies financial analysis and theory to real estate. Mortgage credit analysis and current financing techniques for residential and commercial properties are emphasized. Topics include financial institutions, syndications, and construction financing. *Prq:* FIN 307 and 306 or 311.

FOOD SCIENCE

Professors: J. C. Acton, R. D. Galyean, M. E. Kunkel, *chair*, J. G. Surak, R. L. Thomas; *Associate Professors:* F. H. Barron, K. L. Cason, P. L. Dawson; *Assistant Professor:* V. J. Haley-Zitlin; *Instructor:* R. M. Haliene; *Adjunct Professor:* C. R. Barmore; *Adjunct Assistant Professor:* E. J. Rhodhamel; *Adjunct Instructors:* R. R. Perdue, K. G. Schwartz

FD SC 101 Epochs in Man's Struggle for Food 1(1,0) Study of significant developments in food preservation methods and the impact each has had on man's struggle for food.

FD SC 102 Perspectives in Food and Nutrition Sciences 2(2,0) Discussion course covering topics related to food science and human nutrition. Subjects include topics of current interest and involve familiarization with scientific literature in nutrition and food sciences.

FD SC 201 Man and His Food 2(2,0) Study of food and food products with emphasis on nutrients, nutrient needs, and the relationship between nutrient intake and health. Also discussed are food additives, nutritional awareness (to include nutrition labeling), food protection, and the influence of processing on nutritional quality of food.

FD SC 214 Food Resources and Preservation 4(4,0) Studies food material resources and their preservation for quality and consumption as scientifically and technically practiced in the food industry. Food preservation by refrigerated and frozen storage, thermal processing and pasteurization, dehydration and concentration, fermentation, irradiation, microwave heating, and food additives.

FD SC 306 Food Service Operations 3(3,0) Principles of management of resources in food service systems. Emphasis is on menu planning, types of delivery systems, principles of quantity food production, techniques for cost control and concepts of food science and food safety. *Prq:* FD SC 214 or equivalent or consent of instructor.

FD SC 401, H401, 601 Food Chemistry 14(3,3)/F Even-numbered years. The basic composition, structure, and properties of food and the chemistry of changes occurring during processing utilization. *Prq:* BIOCH 210 or consent of instructor.

FD SC 402, H402, 602 Food Chemistry II 4(3,3)/S Odd-numbered years. Application of theory and procedures for quantitative and qualitative analysis of food ingredients and food products. Methods for protein, moisture, lipid, carbohydrate, ash, fiber, rancidity, color, and vitamin analyses and tests for functional properties of ingredients are examined. *Prq:* BIOCH 210 or consent of instructor.

FD SC 404, 604 Food Preservation and Processing 3(3,0) Principles of food preservation applied to flow processes, ingredient functions, and the

importance of composition and physical characteristics of foods related to their processing. Product recalls and product development concepts. *Prq:* Physics and organic chemistry or biochemistry.

FD SC 406, 606 Food Preservation and Processing Laboratory I 1(1,0) Laboratory exercises on preservation methods, equipment utilized, and processes followed in food manufacture. *Coreq:* FD SC 404/604.

FD SC 407, 607 Quantity Food Production 2(1,3) Principles of the production of food in quantity for use in food service systems. Emphasis is on functions of components of foods and of ingredients in food on the quality of the final product on safe production of food and on proper use of equipment. *Coreq:* FD SC 306 and 404.

FD SC 408, 608 Food Process Engineering 4(3,3) Study of basic engineering principles and their application in food processing operations. The relation between engineering principles and fundamentals of food processing is emphasized. *Prq:* FD SC 214, CH 102, MTHSC 106, PHYS 207 or 200 or 122 or consent of instructor.

FD SC (PKGSC) 409 Total Quality Management for the Food and Packaging Industries 3(3,0) Introduction to the principles of modern quality management with emphasis on quality standards and issues and the practices necessary for food processing and packaging companies to survive in a customer-driven marketplace.

FD SC 417 Seminar 1(1,0) Literature research and oral presentation of current food science topics.

FD SC 418 Seminar 1(1,0) Literature research and oral presentation of current food science topics.

FD SC 420, H420 Special Topics in Food Science 1-3(1-3,0) Special topics in food science not covered in other courses. *Prq:* Permission of instructor.

FD SC 421, H421 Special Problems in Food Science 1-4(0,3-12) Independent research investigation in food science areas not conducted in other courses. *Prq:* Permission of instructor.

FD SC 491 Practicum 1-4 Supervised experiential opportunities in the food industry. *Prq:* Junior standing and consent of department chair.

FOREST AND RECREATION RESOURCES

F&RR (HIST) 392 History of the Environment of the United States 3(3,0) See HIST 392.

FOREST RESOURCES

Professors: G. R. Askew, Jr., B. A. Dunn, *Interim Chair*; D. C. Guynn, Jr., D. L. Ham, R. L. Hedden, D. N.-S. Hon, D. D. Hook, G. D. Kessler, A. W. Lee, G. E. Sabin, W. A. Shain, T. J. Straka, F. H. Tainter, D. H. Van Lear, T. M. Williams, T. E. Wooten; *Associate Professors:* W. H. Conner, C. A. Gresham, J. L. Haymond, A. P. Marsinko, L. R. Nelson, L. E. Nix, V. B. Shelburne, J. H. Syme; *Assistant Professors:* W. R. English, J. D. Lanham, A. E. Miller; *Adjunct Professors:* E. A. Nelson; *Adjunct Associate Professors:* C. A. Dolloff, K. E. Franzreb; *Adjunct Assistant Professors:* R. Costa, P. B. Hamel, J. C. Kilgo, S. K. Nodine

FOR 101 Introduction to Forestry 1(1,0)F Informative sketch of forestry, forests, and forestry tasks of the nation; education and career opportunities for foresters.

FOR 102 Introduction to Forestry 1(1,0)S Continuation of FOR 101.

FOR 205 Dendrology 3(2,3)F Classification, nomenclature, and identification of the principal forest trees of the United States, their geographical distribution, ecological requirements, and economic importance. Field identification of native trees and commonly planted exotics in the Piedmont and surrounding areas. *Prq:* BIOL 103 or consent of instructor.

FOR 206 Forestry Ecology 3(2,3)S Study of the nature of forests and forest trees, how they grow, reproduce, and their relationships to the physical and biological environment. *Prq:* CSENV 202, BIOL 103, FOR 205 or consent of instructor.

FOR (PRTM) 209 Professional Application of Microcomputers 3(1,4) [C.3] See PRTM 209.

FOR 221 Wood Properties 13(2,3)F Formation of wood in forest trees, gross and minute characteristics of wood, defects in wood, variability in wood. *Prq:* BIOL 103 or consent of instructor.

FOR 222 Wood Properties II 3(2,3)S Wood in relation to moisture, heat, sound, light, and electricity; mechanical properties of wood; standard testing procedures for wood. *Prq:* FOR 221 or consent of instructor.

FOR 251 Forest Communities 2(0,6) Study of forest plant species and their successful status and habitat requirements with respect to landform, soil type, and other appropriate aspects of site classification. *Prq:* FOR 205 or consent of instructor.

FOR 252 Forest Engineering (Summer Camp) 3(0,9) Field and drafting practice in mapping, finding, and traversing boundary lines, road location, and forestry applications of surveying equipment and techniques. *Prq:* FOR 205 or consent of instructor.

FOR 253 Forest Resource Measurements I (Summer Camp) 3(0,9) Practical application of field techniques, including timber cruising, measuring tree heights and volumes, constructing volume tables, and boundary-line surveys. *Prq:* FOR 205 or consent of instructor.

FOR 254 Forest Products (Summer Camp) 1(0,3) Tour of the forest products industry of South Carolina with an emphasis on those products and processes of some distinction or special interest. *Prq:* FOR 205 or consent of instructor.

FOR 255 Secondary Wood Products (Summer Camp) 1 Tour of the secondary wood products industries with an emphasis on industries too far from Clemson for the usual half-day field trips during regular sessions. *Prq:* FOR 205 or consent of instructor.

FOR 257 Forest Products Measurements (Summer Camp) 2 Measurements and classifications of a variety of wood products, from trees to finished products. *Prq:* FOR 221, 222 or consent of instructor.

FOR 258 Introduction to Forest Pests 1(0,3) Introduction to forest insects and disease pests with emphasis on their identification and recog-

nition of their damage. *Prq:* FOR 205 or consent of instructor.

FOR 300 Christmas Tree Production 2(2,0)F Theory and practice of establishing, managing, and marketing trees with an emphasis on Christmas tree production in the South. *Prq:* Consent of instructor.

FOR 302, 602 Forest Resource Measurements II 3(2,3)S Practical application of statistical and mensurational techniques in forest management. *Prq:* EX ST 301, FOR 253 or consent of instructor.

FOR 304, 604 Forest Resource Economics 3(3,0)F Economic problems and principles involved in the utilization of forest resources and distribution of forest products; analysis of integrated forest operations. *Prq:* ECON 200 or consent of instructor.

FOR 305 Elements of Forestry 3(2,2)FS Compendium of forestry subjects providing a broad view of the forest environment as it relates to ecology, management, and utilization of forests, especially those of South Carolina. Field and laboratory exercises in the fundamentals of forest-land management. Not open to Forest Resource Management majors. *Prq:* BIOL 103 or consent of instructor.

FOR 306 Wood and Wood Fiber Identification 2(1,3)F Macroscopic and microscopic identification, properties, and uses of selected economically significant timbers. *Prq:* BIOL 103 or consent of instructor.

FOR 308, 608 Aerial Photographs in Forestry 2(1,3)F Introduction to photographic measurements, aerial photointerpretations, mapping, and timber estimating. *Prq:* Forestry summer camp or consent of instructor.

FOR (HORT) 309 Arboriculture—Tree Care and Maintenance 3(3,0) Principles, practices, and problems of protecting and maintaining trees in urban and recreational areas. Examines environmental and biological factors affecting trees in high-use areas, their management and cultural requirements, and the practices necessary for their protection and care as valuable assets in the landscape. *Prq:* Junior standing or consent of instructor.

FOR 310, 610 Silviculture 4(3,3)S Theory and practice of establishing, maintaining, and harvesting forest stands in accordance with ecological and economic principles. *Prq:* FOR 206, Forestry Summer Camp, or consent of instructor.

FOR 311 Forest Products Marketing Practices 3(3,0) Study of marketing practices currently employed by the forest-products industry and the application of basic marketing principles and strategic concepts in the industry's present and future marketing environment. *Prq:* Junior standing or consent of instructor.

FOR 314 Harvesting and Forest Products 4(3,3) Harvesting of forest products, structure and properties of economically important timbers, and production and properties of primary forest products. *Prq:* Forestry summer camp or consent of instructor.

FOR 315 Woodland Ecology 3(3,0) Overview of the forest emphasizing the living and nonliving components of the woodland habitat. Understanding man's use of the forest and interpreting the signs of plants, wildlife, and landscapes.

FOR 321 Drying and Machining of Wood 3(2,3)F Wood seasoning principles and practices, seasoning defects, machinery, and preparation of wood for processing. *Prq:* FOR 221, 222, or consent of instructor.

FOR 323 Deterioration and Preservation of Wood 2(2,0)S Deterioration agents, deterioration of wood in use, control of deterioration in manufacturing, preservation processes, types of preservation, fire retardants.

FOR 325 Chemical Aspects of Wood Utilization 3(2,1)F Fundamental physical, organic, and polymer chemistry is applied to chemical processing of wood. Structures, reactions, and applications of cellulose, hemicelluloses, and lignin are discussed. *Prq:* CH 102 or consent of instructor.

FOR 341 Wood Procurement Practices in the Forest Industry 3(3,0) Study of wood raw material procurement practices currently employed by the forest products industry, including pulp, paper, and related areas. *Prq:* Consent of instructor.

FOR 400, 600 Public Relations in Natural Resources 3(3,0) Identifying relevant policies, their characteristics and acceptance to natural resource management and techniques of maintaining appropriate public relations. *Prq:* Senior standing.

FOR 406 Forested Watershed Management 2(2,0) Basic discussion of processes and measurement of water flow on forested watersheds. Forest land management is stressed to assure adequate water quantity and quality. Role of water in nutrient cycling and forest growth is also discussed. *Prq:* FOR 315 or 401 or consent of instructor.

FOR 407, 607 Forest Operations 3(2,1)F Theory and practice of conducting forestry operations. Major emphasis is on the methods, analysis of associated cost, and productive rates for timber harvesting and other mechanized field operations. *Prq:* Senior standing or consent of instructor.

FOR 409, 609 Multiple-Use Forestry 2(2,0)S Study of the demand placed on forests for a variety of products and uses and how these can and must be reconciled in planning the management of each forest. *Prq:* Senior standing or consent of instructor.

FOR 411, 611 Harvesting Forest Products 3(2,3)S Application of engineering and cost-analysis techniques to the evaluation of the forest transport system and various harvesting situations. *Prq:* FOR 407 or consent of instructor.

FOR 412, 612 Forest Protection 2(2,0)S Prevention and suppression of forest fires; their effect upon the environment and people; factors affecting fire behavior; and use of fire in resource management. *Prq:* Senior standing or consent of instructor.

FOR 413, 613 Integrated Forest Pest Management 3(3,0)F Nature and control of pests of forest trees and products. Focuses on the relation of pests to silviculture, management, and natural forest ecosystems. *Prq:* Junior standing in Forest Resource Management.

FOR 414, 614 Forest Management Plans 2(2,0)S Analysis of factors entering into forest working plans of several forestry organizations; preparation of a preliminary management plan of a sample area. *Prq:* FOR 417.

FOR 415, 615 Forest Wildlife Management 3(2,3)F Principles, practices, and problems of wildlife management with emphasis on upland forest game species. Habitat manipulation through use of appropriate silvicultural practices in association with other techniques is evaluated. *Prq:* FOR 310 or consent of instructor.

FOR 416, 616 Forest Policy and Administration 2(2,0)S Introduction to the development, principles, and legal provisions of forest policy in the United States, and an examination of administrative and executive management in forestry.

FOR 417, 617 Forest Resource Management and Regulation 3(3,0) Fundamental principles and analytical techniques in planning, management, and optimization of forest operations. *Prq:* FOR 302, 304, 308, 310, and Forestry summer camp.

FOR 418 Forest Resource Valuation 2(2,0) Analysis of capital investment tools and their application to decision making among forestry investment alternatives; valuation of land, timber, and other resources associated with forestry, including the impact of inflation and taxes. *Prq:* FOR 309 or consent of instructor.

FOR 419 Senior Problems 1-3(1-3,0) Problems chosen with faculty approval in selected areas of forestry. *Prq:* Senior standing.

FOR 420, 620 Forest Products 3(2,3)S Primary forest products including lumber, poles and piles, veneers and plywoods, secondary wood products; chemically derived products from wood including pulp and paper, distillation products, wood hydrolysis; miscellaneous and minor forest products. *Prq:* FOR 306, Forestry Summer Camp, or consent of instructor.

FOR 421, 621 Biology and Silviculture of Hardwood Forests 2(1,2)F Study of the silvics, growth, and development of major hardwood species of North America that relates these biological characteristics to the ecology, silviculture, and utilization of the hardwood forests of the Eastern United States. *Prq:* FOR 205, 206, 306, 310, or consent of instructor.

FOR 422, 622 Forest Products International Trade 3(3,0) Study of major supply regions, major trade flows, international demand, trade patterns, and industry structure and practices involved in international trade of forest products. *Prq:* Senior standing or consent of instructor.

FOR 423, 623 Current Issues in Natural Resources 2(2,0)F Lectures in various fields of forestry delivered by selected representatives from forest industries, consultants, agencies, associations, and other forestry operations. Course will not be taught when enrollment is less than 15. To be taken Pass/Fail only. *Prq:* Junior standing or consent of instructor.

FOR 425 Forest Resource Management Plans 3(2,3) Development of multiple resource forest management plans. Economic and environmental impacts of implementing management plans. *Prq:* FOR 417 or consent of instructor.

FOR 426, H426 Forest Resource Management Plans Seminar 1(1,0) In-depth exploration of topics and problems presented in FOR 425. To earn honors credit, student must be enrolled in corequisite FOR 425 and earn a B or better in both courses. *Prq:* Senior standing and approval of Department of Forest Resources. *Coreq:* FOR 425.

FOR 429, 629 Wood Design 3(2,3)F Technical mechanical properties of wood; load analysis and design criteria; design of structural elements in wood. *Prq:* FOR 328 or consent of instructor.

FOR 430 Composite Wood Materials 3(2,3)F Manufacturing methods, physical and mechanical properties, and uses of wood-polymer composites, wood laminates, plywood, particleboard, fiberboard, reconstituted board products, structural sandwich panels, paper-base plastic laminates, and extruded and molded products. *Prq:* FOR 222 or consent of instructor.

FOR 431, 631 Recreation Resource Planning in Forest Management 2(1,3)S Odd-numbered years. Analysis of forest recreation as a component of multiple-use forest management; techniques of planning; physical and biological effects on forest environments; and forest site, user, and facility management.

FOR 432, 632 Forest Site Capability 2(2,0)S Analysis of use pressures on the forest land base and their effects on the capability of the forest to satisfy resource demands. Productivity and sensitivity of sites is discussed. *Prq:* Senior standing in Forestry or consent of instructor.

FOR 440 Adhesives and Finishes 3(3,0)S Theory of adhesion, chemical bonding, rheology, physical chemistry of adhesion, theory of finishes and coatings for wood, paper and other materials. *Prq:* Junior standing or consent of instructor.

FOR 441, 641 Properties of Wood Products 3(3,0) Basic properties of wood, including the hygroscopic, thermal, electrical, mechanical, and chemical properties; standard testing procedures for wood. *Prq:* Junior standing or consent of instructor.

FOR 442, 642 Manufacture of Wood Products I 3(3,0) Manufacture of lumber, plywood, millwork, poles, piles, and railroad ties; drying and preservation of wood products; product classifications, grades, and uses. *Prq:* FOR 221 or consent of instructor.

FOR 443, 643 Manufacture of Wood Products II 3(3,0) Manufacture of particleboard, flakeboard, oriented-strand board, fiberboard, and paper products. Includes their physical, mechanical, and chemical properties, and their applications. *Prq:* FOR 221 or consent of instructor.

FOR 444, 644 Forest Products Marketing and International Trade 3(3,0) Study of marketing and international trade practices currently employed by the forest products industry and the application of basic marketing principles and global trade concepts in the industry's current and future environment. *Prq:* FOR 442 or 443 or consent of instructor.

FOR 445, 645 Forest Products and the Environment 3(3,0) Introduction to the use of wood as a basic material and its impact on the environment. Discusses environmental issues affecting wood processing, pulp and paper, and preservation industries. Includes the reuse and recycle of wood and paper wastes and the development of composites from these wastes. *Prq:* FOR 442 or consent of instructor.

FOR 446, 646 Wood Products Applications and Specifications 3(3,0) Application of lumber, plywood, particleboard, waferboard, oriented-strand board, and treated-wood products in building construction. Includes the proper application of load tables, allowable span, and spacing. *Prq:* FOR 442 or 443 or consent of instructor.

FOR 447, 647 Special Problems in Forest Products 1-3(0,3-9) Laboratory, library, or field study of problems in selected areas of forest products. Emphasis is on the planning and execution of research, and the reporting of results. The research work must be conducted under the guidance of a Forest Products faculty. May be repeated for a maximum of three credits, but only if different topics are covered. *Prq:* Senior standing and consent of instructor supervising the study.

FOR 450 Woody Plant Stress Physiology 3(3,0) Structure, function, and physiology of tree shoot and crown growth, wood formation, diameter growth, root growth, and reproduction especially as related to stress factors. *Prq:* BIOSC 401 or FOR 460 or permission of instructor.

FOR (B E, EE&S) 451, H451, 651 Newman Seminar and Lecture Series in Natural Resources Engineering 1(0,2) See B E 451.

FOR 460, 660 Silviculture I 3(2,3) Discussion of the theory and practice of establishing, maintaining, and harvesting forest stands in accordance with ecological and economic principles. *Prq:* FOR 206 and Forestry Summer Camp or consent of instructor.

FOR H461 Silviculture Honors Seminar I 1(1,0) In-depth exploration of topics and problems presented in FOR 460. To earn honors credits, students must be enrolled in corequisite FOR 460 and earn a B or higher in both courses. *Prq:* Junior standing and approval of Department of Forest Resources. *Coreq:* FOR 460.

FOR 462, 662 Silviculture II 3(2,3) Discussion of forest management practices that affect ability of the land to produce multiple forest resources, with emphasis on water, nutrients, and fire. *Prq:* FOR 401 or consent of instructor.

FOR H463 Silviculture Honors Seminar II 1(1,0) In-depth exploration of topics and problems presented in FOR 462. To earn honors credit, students must be enrolled in corequisite FOR 462 and earn a B or higher in both courses. *Prq:* Junior standing and approval of Department of Forest Resources. *Coreq:* FOR 462.

FOR 480 Selected Topics in Urban Forestry 1-3(1-3,0) Study of selected and varied topics, problems, and issues in urban forestry and arboriculture through readings, class discussion, and individual and group projects. *Prq:* FOR (HORT) 309.

FOR H491 Senior Honors Thesis I 3(3,0) Individual forestry research for students in the Forestry Honors program that focuses on developing a plan of research under the direction of a faculty advisory committee. *Prq:* Senior standing, participation in Honors Program, and approval of Department of Forest Resources.

FOR H492 Senior Honors Thesis II 3(3,0) Individual forestry research for students in the Forestry Honors program that focuses on data collection, analysis, report writing, and oral presentation. *Prq:* FOR H491.

FRENCH

Professor: M. Cranston; *Associate Professors:* J. C. Bednar, D. J. Calvez, D. Lepetit, K. M. Szmurlo; *Assistant Professor:* J. B. Macy; *Instructor:* R. R. Willingham; *Visiting Assistant Professor:* R. Lanzoni

FR 101 Elementary French 4(3,1) Multimedia course for beginners that combines video, audio, and print to teach the fundamentals of the French language and culture. Emphasis is on communicative proficiency (listening comprehension and speaking, reading, and writing).

FR 102 Elementary French 4(3,1) Continuation of FR 101; three hours a week of classroom instruction and one hour a week in the language laboratory.

FR 121 Intensive Elementary French 8(6,2) Intensive multimedia course for beginners which combines the content of FR 101 and FR 102 in one semester. May not be taken by students who have completed FR 101 or 102.

FR 151 French for Graduate Students 3(3,0) Intensive program only for graduate students preparing for the reading examination in French. A minimum grade of B on a final examination will satisfy graduate school foreign language requirement. May be repeated once for credit. To be taken Pass/Fail only. *Preq:* Graduate standing.

FR 201, H201 Intermediate French 3(3,0) Brief review of FR 101 and 102, with conversation, composition, and dictation, and the beginning of more serious reading of French prose. Includes literary and cultural perspectives. *Preq:* FR 102.

FR 202, H202 Intermediate French 3(3,0) Emphasis on reading nontechnical French prose more rapidly. Writing, speaking, and listening skills will continue to be developed. Includes literary and cultural perspectives. *Preq:* FR 201.

FR 221 Accelerated French II 6(6,0) Accelerated intermediate course that can be taken in lieu of FR 201 and 202. Through conversation, composition, and intensive grammar review, proficiency is stressed. Includes literary readings and cultural perspectives. May not be taken by students who have completed FR 201 or 202. *Preq:* FR 102, 121 or consent of department chair.

FR 299 Foreign Language Drama Laboratory 1(0,3) Participation in foreign drama productions. No formal class meetings, but an average of three hours per week in a foreign language drama workshop for production. May be repeated for a total of three credit hours. *Preq:* Consent of instructor directing the play.

FR 300 Survey of French Literature 3(3,0) Study of selected masterpieces of French literature in their artistic, cultural, and historical context. May include theme and genre studies. *Preq:* FR 202 or consent of department chair.

FR 305 Intermediate French Conversation and Composition I 3(3,0) Practice in the spoken language, with stress on vocabulary building, pronunciation, intonation, and comprehension; written work to increase accuracy; assignments in the language laboratory. *Preq:* FR 202 or consent of department chair.

FR 307 French Civilization 3(3,0) Study of significant aspects of French culture from its origins to the present. *Preq:* FR 202 or consent of department chair.

FR 309 French Linguistics 3(3,0) Study of the fundamental structures of the French language: phonetics, syntax, and semantics. *Preq:* FR 202 or consent of department chair.

FR 316 French for International Trade I 3(3,0) Spoken and written French common to the French-speaking world of business and industry, with emphasis on business practices and writing and translating business letters and professional reports. Cross-cultural references provide opportunity for comparative and contrastive analyses of American and French cultural patterns in a business setting. *Preq:* FR 202 and 305 (either prerequisite or concurrently); or consent of department chair.

FR (PO SC) 383 French Foreign Language News 1(1,0) See PO SC 383.

FR (PO SC) 386 Topical Issues in French 1(1,0) See PO SC 386.

FR H391 Survey of French Literature (Honors) 1(1,0) One-hour independent study to allow honors students to pursue supervised research on a topic relating to the literary, cultural, and artistic movement in France. *Coreq:* FR 300 and membership in Calhoun College Honors Program.

FR 398 Directed Reading 1-3(1-3,0) Directed study of selected topics in French literature, language, and culture. May be repeated for a maximum of six credits. *Preq:* Consent of department chair.

FR 400 Modern French Literature 3(3,0) Study of selected works of twentieth-century French literature in their artistic, cultural, and historical context. *Preq:* FR 202 or consent of department chair.

FR 406 Nineteenth-Century French Literature 3(3,0) Study of selected works of nineteenth-century French literature in their artistic, cultural, and historical context. *Preq:* FR 300 or consent of department chair.

FR 407 Eighteenth-Century French Literature 3(3,0) Selected readings in French literature of the Enlightenment with emphasis on the social and intellectual context of the age. *Preq:* FR 300 or consent of department chair.

FR 408 Seventeenth-Century French Literature 3(3,0) Major literary figures, themes, and forms of 17th-century French literature. *Preq:* FR 300.

FR 409 Advanced Grammar and Composition 3(3,0) Intensive study of syntax and stylistics through composition and translations. *Preq:* Senior standing or consent of department chair.

FR 410 Francophone Literature 3(3,0) Study of selected works of francophone literature, with an emphasis on Africa and the Caribbean, in their artistic, cultural, historical, and political contexts. *Preq:* FR 300 or consent of department chair.

FR 411 Advanced French Conversation and Composition 3(3,0) Continuation of FR 305, with emphasis on greater fluency and sophistication in oral and written expression. *Preq:* FR 305 or consent of instructor.

FR 416 French for International Trade II 3(3,0) Study of language and cultural environment of the French-speaking markets of the world, includ-

ing the linguistic and cultural idioms which support global marketing in general and the international marketing of textiles, agricultural products, and tourism in particular. *Preq:* FR 316.

FR 417 The French Corporation 3(3,0) Examination of the organization, structure, functioning, and economic role of the French business enterprise. *Preq:* FR 316 or consent of department chair.

FR H438 French Honors Research 3(3,0) Individual honors research conducted under direction of the Language Department faculty. *Preq:* Junior standing and membership in Calhoun College Honors Program.

FR H439 French Honors Thesis 3(3,0) Individual honors research conducted and thesis completed under direction of Language Department faculty member. *Preq:* Junior standing, FR H438, and membership in Calhoun College Honors Program.

FR H491 Modern French Literature (Honors) 1(1,0) One-hour independent study to allow honors students to pursue in depth an author, work, movement, or genre related to contemporary French culture, art, or literature. *Coreq:* FR 400 and membership in Calhoun College Honors Program.

FR H492 The French Corporation (Honors) 1(1,0) One-hour independent study to allow honors students to pursue an in-depth study of the organization, structure, functions, and economic role of a French business enterprise. *Coreq:* FR 417 and membership in Calhoun College Honors Program.

FR 498 Independent Study 1-3(1-3,0) Directed study of selected topics in French literature, language, and culture. May be repeated for a maximum of six credits. *Preq:* Consent of department chair.

FR 499, 699 Selected Topics in French Literature 3(3,0) Selected topics that have characterized French literature, language, and culture. May be repeated for a maximum of six credits. *Preq:* Consent of department chair.

GENETICS

Professors: W. C. Bridges, Jr., S. R. Chapman, W. D. Graham, Jr., D. G. Heckel, R. H. Hilderman, H. T. Knap, J. S. Rice, E. R. Shippe, W. M. Surver; *Associate Professors:* A. G. Abbott, W. V. Baird, R. A. Dean, N. H. Ferguson, R. A. Wing

GEN 302, H302 Introductory Genetics 4(3,3) Basic course introducing fundamental principles of inheritance in prokaryotes and eukaryotes. Emphasis is given to Mendelian genetics, physical and chemical basis of heredity, population genetics, and microbial genetics. *Preq:* BIOL 104 and one semester of biochemistry, or BIOL 110, or consent of instructor.

GEN (BIOSC) 416, 616 Recombinant DNA 3(3,0) Familiarizes students with the most current facts and concepts of molecular genetics. Lectures focus on gene organization, structure, and expression in prokaryotes and eukaryotes, highlighting current technologies and research in these areas. *Preq:* GEN 302 or equivalent and one semester of biochemistry or consent of instructor. A developmental biology course is also strongly recommended.

GEN (BIOSC, MICRO) 418, 618 Biotechnology I: Nucleic Acids Techniques 4(2,4) See BIOSC 418.

GEN 451, 651 Advanced Genetics 3(3,0)F Advanced study of the principles of general genetics. Topics emphasized are variations in chromosome number and structure, natural and induced mutations, extranuclear inheritance, recombination, control of gene activity, genes and development, genetics of behavior patterns, population genetics, systems of mating, genetics and man. *Prq:* GEN 302 or equivalent.

GEN (ENT) 495, 695 Insect Biotechnology 3(3,0) See ENT 495.

GEOGRAPHY

Professor: G. W. Burnett; *Associate Professor:* J. A. Miller; *Assistant Professor:* T. G. Young

GEOL 101 Introduction to Geography 3(3,0) Survey of the nature of geography, with emphasis on the discipline's organizing themes of earth science, relations between people and their environments, interrelations between places, locational analysis, and area studies.

GEOL 103 World Regional Geography 3(3,0) Systematic and descriptive survey of the major regions of the world, including their physical and cultural features. Provides a global context for courses in the social sciences and humanities.

GEOL 106 Geography of the Physical Environment 4(3,3) Examines the condition of the physical environment, especially the earth's surface and the processes that act on it. Topics range from earth-sun relations to the evolution of landscapes; human habitats and human alteration of the environment.

GEOL 301 Political Geography 3(3,0) Geographic basis of states: sovereignty, territory, power within states, relations between states. The geography of international affairs. *Prq:* GEOL 101 or 103 or permission of instructor.

GEOL 302 Economic Geography 3(3,0) Spatial analysis of economic activity, with an emphasis on regional economics and development. Topics include world population; technology and economic development; principles of spatial interaction; and geography of agriculture, energy manufacturing, and tertiary activities. *Prq:* GEOL 101 or 103 or permission of instructor.

GEOL 303 Urban Geography 3(3,0) Historical and contemporary survey of the urban world, with particular attention paid to the relationship between people and urban places. Topics include the rise of cities, urban hierarchies, urban land use, and the social geography of cities. *Prq:* GEOL 101 or 103 or permission of instructor.

GEOL 305 Cultural Geography 3(3,0) Broad examination of the basic cultural variables in the human occupation of the earth. Ecological, spatial, regional, and historical approaches; topics vary but may include cultural areas and distributions, cultural change, cultural landscape, and cultural ecology. *Prq:* GEOL 101 or 103 or permission of instructor.

GEOL 306 Historical Geography 3(3,0) Exploration of geographical change and the varied patterns of past human activities and people's rela-

tionships with the physical environment. Case studies from around the world are used to emphasize key themes in historical geography. Not open to students who have taken GEOL 102 or 220. *Prq:* GEOL 101 or 103 or consent of instructor.

GEOL 330 Geography of the Middle East and North Africa 3(3,0) Thematic survey of a world region extending from Morocco to Afghanistan. Emphasis on climate, environment, social geography, historical development of the regional culture of Islam, and common problems facing the area today.

GEOL 340 Geography of Latin America 3(3,0) Introduction to the physical, economic, political, and human/cultural geography of Latin America. Special focus on regional unity and diversity and on the historical interaction of man and environment.

GEOL 360 Geography of Tropical Africa 3(3,0) Study of how tropical, or sub-Saharan, Africa functions in the modern world. Africa's physical environments, peoples and cultures, colonial and post-colonial history, and ideologies of economic development. Five basic themes are covered: population, natural resources, environmental quality, political organization, economic development. *Prq:* GEOL 101 or 103 or consent of instructor.

GEOL 401, 601 Studies in Geography 3(3,0) Intensive study of the geography of a selected world region, such as North America, Europe, or the Middle East, or the geography of a topic such as the geography of oil or the geography of underdevelopment. With departmental permission, may be repeated once for credit. *Prq:* GEOL 101 or 103 or permission of instructor.

GEOL 410, 610 Geography of the American South 3(3,0) Study of the geography of the American South in its changing complexities across almost 400 years of development. *Prq:* GEOL 101 or 103 or consent of instructor.

GEOL 420, 620 Historical Geography of the United States 3(3,0) Survey that places the spatial concepts of geography into a time sequence with special emphasis upon the United States. *Prq:* GEOL 101 or 103 or consent of instructor.

GEOL (PRTM) 430, 630 World Geography of Parks and Equivalent Reserves 3(3,0) See PRTM 430.

GEOL 499 Independent Study in Geography 3(3,0) Study of selected topics in geography under the direction of a faculty member chosen by the student. Student and faculty member develop a course of study designed for the individual student and approved by the department chair prior to registration.

GEOLOGY

Professors: B. E. Davies, F. J. Molz, R. D. Warner, *Chair*; *Associate Professors:* R. W. Falta, J. R. Wagner; *Assistant Professors:* J. W. Castle, R. A. Christopher, L. C. Murdoch; *Lecturers:* L. B. Krause, C. R. Rebert, J. L. Tinsley; *Research Associates:* S. E. Brane, R. A. Hodges; *Visiting Instructor:* E. R. Caldwell

GEOL 100 Current Topics in Geology 1(1,0) Lectures and demonstrations covering topics of current interest in the different fields of geology.

Recent research developments and career opportunities in the geosciences are emphasized.

GEOL 101, H101 Physical Geology 3(3,0) Study of the minerals and rocks which compose the earth's crust, their origins and transformations. Emphasis is on geological processes, both internal and external, by which changes are produced on or in the earth.

GEOL 102 Historical Geology 4(3,3) Survey of the earth's geologic history emphasizing how the continents and ocean basins have evolved through geologic time. Evolution of life from the beginning of the fossil record through the present; identification of fossil plants and animals and interpretation of earth's past through study of geologic maps. Field trips illustrate principles. *Prq:* GEOL 101, 103.

GEOL 103, H103 Physical Geology Laboratory 1(0,2) Laboratory to accompany GEOL 101. Instruction is provided in the identification of minerals and rocks and in the interpretation of geologic processes through study of topographic maps. Field trips provide direct observation of processes and results. *Coreq:* GEOL 101.

GEOL 112 Earth Resources 3(3,0) Survey of earth's mineral, energy, water, and land resources, and environmental and societal impacts associated with the use of these resources. *Prq:* GEOL 101.

GEOL 114 Earth Resources Laboratory 1(0,2) Laboratory to accompany GEOL 112. Instruction is provided in the identification of ore and gem minerals and of other earth materials of economic importance. Land and water resources are explored through the use of topographic maps, aerial photographs, remotely sensed images, and field trips. *Prq:* GEOL 103. *Coreq:* GEOL 112.

GEOL 210 Geology of the National Parks 3(3,0) Survey of selected national parks and monuments emphasizing the dynamic geological processes which have shaped the landscapes of these areas. Special attention is focused on parks exhibiting recent geological activity related to volcanoes, earthquakes, and glaciers. Slides and films are used to highlight specific geological features.

GEOL (ASTR) 220 Planetary Science 3(3,0) Survey of the formation and evolution of planetary bodies. Emphasis is on the origin of planetary material and comparative study of the primary processes operative on planetary surfaces. The major features of the planets and moons in our solar system, as revealed by recent space missions, are described.

GEOL 300, H300 Environmental Geology 3(3,0) Discussion-oriented introductory study of the relationships of man to his physical surroundings and the problems resulting from upsetting the established equilibria of geologic systems; man's role as a geologic agent, environmental conservation and management. *Prq:* GEOL 101 or consent of instructor.

GEOL 302, H302 Structural Geology 4(3,3) Diverse geological structures of the earth, their description, origin, and field recognition. Practical problems in interpreting geologic structures are utilized, in addition to theoretical considerations of the mechanics and causes of tectonism. *Prq:* GEOL 101.

GEOL 306 Mineralogy 4(3,3) Introduction to fundamental concepts of crystallography and crystal chemistry. Topics include crystal symmetry, principles of crystal structures, introductory x-ray crystallography, composition and stability of minerals, and systematic mineralogy. Laboratory exercises emphasize the recognition of crystallographic features and identification of minerals based on their physical properties.

GEOL 310 Optical Mineralogy 3(1,5) Involves techniques of mineral identification with polarizing microscope. Criteria are provided for the determination of optical properties using oil immersion grain mounts. Students are also introduced to the study of minerals and rocks in thin section. Lecture topics explore mineral optics theory. *Preq:* GEOL 306.

GEOL 314 Sedimentary Petrology 3(2,3) Origin, composition, and texture of sediments and sedimentary rocks, including both siliclastic and chemical varieties. Interpretation of tectonic settings, depositional systems, facies relationships, and diagenesis. Laboratory involves description and classification of hand specimens and thin sections and analytical methods. *Preq:* GEOL 102, 310, or consent of instructor.

GEOL 316, H316 Igneous and Metamorphic Petrology 3(2,3) Classification, occurrence, and origin of igneous and metamorphic rocks. Discussion of the chemical and physical processes involved in magmatic crystallization and metamorphism. Laboratory study of igneous and metamorphic rocks in hand specimen and thin section. Not open to students who have received credit for GEOL 309. *Preq:* GEOL 306, 310 or consent of instructor.

GEOL 318 Introduction to Geochemistry 3(3,0) Introduction to distribution of elements in the core, mantle, and crust of the earth. Control of rock type on trace element content in soils and sediments. Weathering, soil and regolith formation, water-sediment interrelations; solubility, mobility and bioavailability in relation to redox, pH and complexation; biogeochemical cycles of selected elements. *Preq:* GEOL 101 and CH 102 or consent of instructor.

GEOL 320, H320 Engineering Geology 3(3,0) Application of engineering principles to geologic problems. Identification of important material properties and mechanics of earth materials. Techniques of geologic site evaluation with emphasis on civil works and construction projects. *Preq:* GEOL 101, 103, MTHSC 108, PHYS 122.

GEOL 401, 601 Applied Geophysics 3(2,2) Introduction to the most important methods of geophysical exploration and their application to the investigation of subsurface groundwater and mineral resources. Emphasis is on the principles, techniques, interpretations and limitations of magnetic, gravimetric, electrical, electromagnetic, well-logging, and seismic geophysical surveys. *Preq:* GEOL 101 or consent of instructor; PHYS 208 or 221 recommended.

GEOL 403, 603 Invertebrate Paleontology 3(2,3) Study of life of past geologic ages as shown by fossilized remains of ancient animals, with emphasis on the invertebrates. *Preq:* GEOL 101 or consent of instructor.

GEOL 405, 605 Geomorphology 3(2,3) Study of the surface features of the earth—their form, nature, origin, development, and rates and patterns of changes they are undergoing. Laboratory studies emphasize a process approach to terrain analysis stressing complex interactions of geologic, climatic, and tectonic forces. *Preq:* GEOL 101, 102, or consent of instructor.

GEOL 408, 608 Geohydrology 3(3,0) Study of the hydrologic cycle, aquifer characteristics, theory of groundwater movement, mechanics of well flow, experimental methods, and subsurface mapping. *Preq:* GEOL 101, 102.

GEOL 411, H411 Research Problems 1-3(0,3-9) Field, laboratory, or library study of an approved topic in geology. Topic would be one not normally covered in formal courses, but may be an extension of a course. Taught either semester and may be repeated for a maximum of six credits. *Preq:* Senior standing or consent of instructor.

GEOL 413, 613 Stratigraphy 3(2,2) Analysis of stratified rocks as the repository of earth history and the conceptual framework used to synthesize the world geologic record as a coherent whole. Emphasis is placed not only on traditional lithostratigraphy but also on modern seismic stratigraphy, biostratigraphy, magnetostratigraphy, and current stratigraphic issues. *Preq:* GEOL 314 or consent of instructor.

GEOL 415 Analysis of Geological Processes 3(3,0) Introduction to methods for analyzing geological processes. Mathematical methods are introduced to solve problems related to stream flow, reaction kinetics, radioactive decay, heat flow, diffusion, fluid flow through geologic media and related processes. *Preq/Coq:* MTHSC 206 or consent of instructor.

GEOL 451, 651 Selected Topics in Hydrogeology 1-4(1-3,0-3) Selected topics in hydrogeology, with emphasis on new developments in the field. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* GEOL 300 or 408, or consent of instructor.

GEOL 475 Summer Geology Field Camp 6(4,6) Introduction to field techniques emphasizing methods applied to hydrogeology. Description and mapping of hydrogeologic units and structures using outcrop data and lithologic and geophysical well logs. Construction of potentiometric maps from water level data. Performance of pumping tests on mapped aquifers and analysis of data to determine aquifer characteristics. *Preq:* GEOL 302 and 306, or consent of instructor.

GERMAN

Professors: J. M. Melton, H. M. Riley, M. M. Sinka;
Associate Professor: E. P. Arnold; *Instructor:* L. Kube;
Visiting Instructor: D. Hamilton

GER 101 Elementary German 4(3,1) Course for beginners in which, through conversation, composition, and dictation, the fundamentals of the language are taught and a foundation is provided for further study and the eventual ability to read and speak the language. Three hours a week of classroom instruction and one hour a week in the language laboratory.

GER 102 Elementary German 4(3,1) Continuation of GER 101; three hours a week of classroom instruction and one hour a week in the language laboratory.

GER 151 German for Graduate Students 3(3,0) Intensive program only for graduate students preparing for the reading examination in German. A minimum grade of B on a final examination will satisfy graduate school foreign language requirement. May be repeated once for credit. To be taken Pass/Fail only. *Preq:* Graduate standing.

GER 190 Study and Travel Abroad Preparation 1(1,0) Prepares students for study/travel in German-speaking countries. Students are sensitized to cross-cultural differences and are provided with practical skills and sources of information. Taught mainly in English. To be taken Pass/Fail only.

GER 201, H201 Intermediate German 3(3,0) Brief review of GER 101 and 102, with conversation, composition, and dictation, and the reading of more serious German prose in short stories and plays. Includes literary and cultural perspectives. *Preq:* GER 102.

GER 202, H202 Intermediate German 3(3,0) Emphasis on reading nontechnical German prose more rapidly. Writing, speaking, and listening skills continue to be developed. Includes literary and cultural perspectives. *Preq:* GER 201 or consent of instructor.

GER 299 Foreign Language Drama Laboratory 1(0,3) Participation in foreign language drama productions. No formal class meetings, but an average of three hours per week in a foreign language drama workshop for production. May be repeated for a total of three credits. *Preq:* Consent of instructor directing the play.

GER 301 Twentieth-Century German Drama 3(3,0) Selected works from major German-speaking dramatists of the 20th century, including Brecht, Dürrenmatt, and Frisch. Required of German majors. *Preq:* GER 202 or consent of department chair.

GER 302 Twentieth-Century German Prose and Poetry 3(3,0) Selected prose and poetry from major 20th century German-speaking authors, including Rilke, Mann, Hesse, Kafka, and Böll. Required of German majors. *Preq:* GER 202 or consent of department chair.

GER 305 Intermediate German Conversation and Composition 3(3,0) Practice in the spoken language, with emphasis on vocabulary, pronunciation, and comprehension; written exercises for accuracy. Required of German majors. *Preq:* GER 202 or consent of department chair.

GER 308 German Civilization 3(3,0) Study of significant aspects of the culture of the German-speaking peoples from their origins to 1945. *Preq:* GER 202 or consent of department chair.

GER 309 Modern German Culture 3(3,0) Study of modern German culture from 1945 to the present with particular emphasis on the Federal Republic of Germany and significant aspects pertaining to the German Democratic Republic. *Preq:* GER 202 or consent of department chair.

GER 316 German for International Trade 1 3(3,0) Spoken and written German common to the German-speaking world of business and in-

dustry, with emphasis on business practices and writing and translating business letters and professional reports. Cross-cultural references provide opportunity for comparative and contrastive analysis of American and German cultural patterns in a business setting. *Prq:* GER 251 or 202 and 305 (prerequisite or concurrently); or consent of department chair.

GER (PO SC) 384 German Foreign Language News 1(1,0) See PO SC 384.

GER (PO SC) 387 Topical Issues in German 1(1,0) See PO SC 387.

GER 398 Directed Reading 1-3(1-3,0) Directed study of selected topics in German literature, language, and culture. May be repeated for a maximum of six credits. *Prq:* Consent of department chair.

GER 400 Goethe and His Age 3(3,0) Study of the most significant period of German literature, with readings from works by Goethe, Schiller, and the Romantics. Supplementary materials may include audio visuals and documents on the music, art, and science of the period. Recommended for German majors. *Prq:* GER 301, 302, or consent of department chair.

GER 401 Studies in German Literature I 3(3,0) Selected topics in German literature from the beginning to 1832. *Prq:* GER 301, 302, or consent of department chair.

GER 402 Studies in German Literature II 3(3,0) Study of selected topics in 19th or 20th century German literature. *Prq:* GER 301, 302, or consent of department chair.

GER 403 Studies in German Literature III 3(3,0) Study of a major theme in German literature within a chosen time period or in the work of one major author. The themes may be subject- or genre-oriented. *Prq:* GER 301, 302, or consent of department chair.

GER 411 Studies in the German Language I 3(3,0) Advanced training in the spoken and written language with emphasis on vocabulary, syntax, and stylistics. *Prq:* GER 305 or consent of department chair.

GER 412 Studies in the German Language II 3(3,0) In-depth study of terminology and syntax for specific subject areas in business, in the liberal arts, and in the sciences. *Prq:* GER 301, 302, 305, or consent of department chair.

GER 413 Studies in German Culture 3(3,0) Intensive study of selected topics concerning cultural phenomena of the German-speaking nations. *Prq:* GER 301, 302, 305, or consent of department chair.

GER 416 German for International Trade II 3(3,0) Study of language and cultural environment of the German-speaking markets of the world, including linguistic and cultural idioms which support global marketing in general and the international marketing of textiles, agricultural products, and tourism in particular. *Prq:* GER 316.

GER 417 German for International Trade III 3(3,0) Examination of the cultural and economic aspects of reconstructing eastern Germany's economy since the 1990 German unification. *Prq:* One German course at the 300 level or consent of department chair.

GER 498, 698 Independent Study 1-3(1-3,0) Supervised study of selected topics in German literature, language, or culture. May be repeated for a maximum of six credits. *Prq:* Consent of department chair.

GRAPHIC COMMUNICATIONS

Professors: E. L. Weir, W. E. West, *Chair*; *Associate Professors:* S. T. Ingram, J. M. Leininger; *Instructors:* S. S. Cramer, M. M. Grant, N. W. Leininger, P. G. Rose; *Lecturers:* R. M. Carter, S. H. Edlin, K. Martin, F. C. Porcher, Jr., D. R. Swaney; *Adjunct Professor:* E. Simon; *Adjunct Associate Professor:* L. W. Evans

G C 101 Orientation to Graphic Communications 1(1,0) Introduction to the curriculum and the industry including its processes, products, and careers. Emphasis is placed on the attributes which are most desirable for successful entry and advancement up a variety of career ladders.

G C 104, H104 Graphic Communications 1 4(2,6) Emphasis on basic graphic arts industrial concepts, principles, and practices, with laboratory applications in photography, layout and design, conventional and electronic copy preparation, reproduction photography, offset lithography, screen printing and finishing operations. Flexography, gravure, letterpress and specialty printing processes are also covered, along with environmental, health, and safety concerns.

G C 207, H207 Graphic Communications II 3(1,6) Continuation of G C 104. Intermediate course for graphic communications and graphic arts specialists which broadens skills and technical knowledge in areas of layout, copy preparation, reproduction photography, film assembly, screen printing, lithographic presswork, and finishing. *Prq:* G C 101, 104, typewriter/computer keyboarding skills of 20 net words per minute.

G C 215, H215 Photographic and Digital Imaging Techniques 3(1,6) Emphasizes application of black and white and color imaging by photographic and digital technologies. Laboratory experiences assure confidence in the use of photographic and digital techniques for creating and enhancing original images for graphic reproduction and distribution.

G C 310, H310 Alternative Approaches to Imaging 3(1,6) Promotes the refining of skills learned in G C 104 and 207, with an in-depth study and application of computerized pre-press systems and methodologies. Serves as a transition course to the advanced graphic classes teaching offset lithography, flexography, screen printing, and gravure. *Prq:* G C 207 or consent of instructor.

G C 350 Graphic Communications Internship I 1(0,3) Full-time supervised employment in an industrial in-plant setting for expansion of experience with materials and processes, production people, and organizations. *Prq:* G C 104 or 207 or equivalent and consent of instructor.

G C 405, H405, 605 Package and Specialty Printing 2(2,0) Problems and processes for printing and converting in package, label, and specialty printing industries. Flexographic preparation, printing, die making, diecutting, transfer printing, screen container printing, pad printing, and bar code production are covered. New develop-

ments and trends are discussed. To be taken concurrently with G C 406. *Prq:* G C 310, 350, and THRD 224, or permission of instructor.

G C 406, H406, 606 Package and Specialty Printing Laboratory 2(0,6) Laboratory in techniques for printing and converting in package, label, and specialty printing industries. Experiences in flexographic prepress; printing; die design, die making and diecutting for label, folding cartons and corrugated; sublimation and plastisol transfer screen printing; and glass, plastic, and metal container printing. *Prq:* Concurrent enrollment in G C 405 or permission of instructor.

G C 407, 607 Advanced Flexographic Methods 4(2,6) In-depth study of the methods used in flexographic printing and converting of porous and nonporous substrates. Theory and laboratory applications include setting standards for process color, preparation of plate systems, ink mixing and color matching, testing of films and foils, analysis of recent developments, and prediction of future markets. *Prq:* G C 406 and 444 or consent of instructor.

G C (THRD) 410, 610 Selected Topics 1-3 (1-3,0) See THRD 410.

G C 440, H440, 640 Advanced Lithographic Methods 5(2,9) Advances skills learned in previous graphic communications courses and applies the knowledge to large format presses. Students work from the design conception stage through all aspects of preparation, production, and finishing. Emphasis is placed on understanding and incorporating emerging technologies into the production workflow. *Prq:* G C 310 and 350 or consent of instructor.

G C 444, H444, 644 Current Developments and Trends in Graphic Communications 4(2,6) Advanced course for Graphic Communications majors. Emphasis is on the theory and technical developments that affect process and equipment selection. Topics include color theory and application, electronic color scanning, electronic prepress and communications, gravure color quality control and analysis. *Prq:* G C 350, 406, and 440.

G C 445, 645 Advanced Screen Printing Methods 3(2,3) In-depth study of the systems and materials used with the screen printing process. Emphasis is placed on techniques of control and procedures for establishing screen printing methods and standards. *Prq:* G C 207 or consent of instructor.

G C 446, 646 Ink and Substrates 3(2,3) Covers the components, manufacturing, process use as well as end use of ink and substrates used in lithography, flexography, gravure and screen printing. It examines the interrelationship between inks, substrates, and the printing process. Through controlled testing and examination, the optimum conditions for improved printability are determined. *Prq:* G C 406 or 440 or consent of instructor.

G C 448, H448, 648 Planning and Controlling Printing Functions 3(3,0) Study of systems for setting printing production standards, estimating, scheduling, job planning, and the selection of new hardware and technologies. *Prq:* G C 350, 406, 440, 450.

G C 450 Graphic Communications Internship II 1(0,3) Continuation of G C 350. *Prq:* G C 350; 406 or 440; and/or consent of instructor.

G C 451 Special Projects in Graphic Communications 1-6(0,3-18) Advanced projects covering theory and/or practices going beyond the scope of regular coursework. Written project approval required before registering. *Preq:* Junior or Senior standing with three graphic communications courses completed.

G C 455 Advanced Graphic Communications Internship 1(0,3) Full-time employment in an industry directly or indirectly related to printing. The work site and job must be approved in advance. *Preq:* G C 350.

G C 480 Senior Seminar in Graphic Communications 2(2,0) Study of current trends and issues in the graphic communications industry. Class centers around group discussions dealing with relevant topics facing the graphic communications manager today. Students are asked to draw upon academic experiences, internship experiences, and library research to facilitate discussion. Must be taken during the last semester on campus.

GREAT WORKS

G W (ENGL) 301 Great Books of the Western World 3(3,0) Course introducing the Great Works minor. Includes readings about the Great Books concept, as well as various great books from the humanities, the arts, and the natural and social sciences. *Preq:* Sophomore literature (ENGL 207 or 208 strongly recommended).

G W 403 Special Topics in Continental Literature 3(3,0) Important primary texts written in modern European languages are taught in English. Content varies according to instructor. *Preq:* Sophomore literature.

HEALTH

Associate Professors: R. L. Goldstein, K. A. Kemper, C. T. Rainey; *Assistant Professors:* R. M. Mayo, H. D. Spitzer; *Lecturers:* A. H. Abercrombie, S. D. Lovitt, W. W. Sherrill, J. S. Witthoef; *Adjunct Professors:* J. A. Johnson, Jr., W. J. Jones; *Adjunct Associate Professor:* F. G. Jones; *Adjunct Assistant Professor:* J. T. Long

HLTH 201 History and Philosophy of Public Health and Medicine 2(2,0) Explores how public health and medicine evolved, the social and technological factors and historical turning points in their development, the philosophies and major issues of public health and medicine including beliefs about the nature and causes of health and illness, and the protection and management of community health.

HLTH 202 Introduction to Public Health 3(3,0) Examination of the forces that have influenced current health delivery systems, health practices, and trends. General systems theory is introduced. Health majors and minors will be given enrollment priority.

HLTH 203 Overview of Health Care Systems 2(2,0) Introduction to the health care delivery system including public health and health care components. Examines and discusses individual and public expectations of need and demand for health care and delivery of public health and health care services.

HLTH 240 Determinants of Health Behavior 3(3,0) Analysis of health behaviors based on psychological, social, cultural, and environmental factors. Introduction to health behavior theories. Health majors and minors will be given enrollment priority. *Coreq:* HLTH 298 or consent of instructor.

HLTH 250 Health and Fitness 3(3,0) Study of interrelationship between health and fitness. Emphasis is on the cardiovascular system and benefits of exercise.

HLTH 298 Human Health and Disease 3(3,0) Study of good health practices. Emphasis is on lifestyles and measures of health. Health majors and minors will be given enrollment priority.

HLTH 301 Medications in Health 3(3,0) Exploration of the use of medications in the maintenance of health, with emphasis on the consumer's responsibility and informed decision making. *Preq:* Two-semester sequence in science or consent of instructor.

HLTH 303 Communication in Health Systems 3(3,0) Introduction to medical terminology, composing health reports, and health-funding proposals and media communications. *Preq:* HLTH 298.

HLTH 305 Body Response to Health Behaviors 3(3,0) Positive benefits and the negative impact of certain behaviors at cellular, organ, and body-system levels are examined. The pathways of selected injury and disease are explored. Expected physiological changes are applied in identifying strategies for promoting health in the presence (or absence) of disease. Health majors and minors will be given enrollment priority. *Coreq:* BIOSC 223 or consent of instructor.

HLTH 310 Women's Health Issues 3(3,0) Exploration of the specific health needs of women, with emphasis on understanding and prevention of problems of women's health. Health majors and minors will be given enrollment priority. *Preq:* Two-semester sequence in science or consent of instructor.

HLTH 315 Social Epidemiology 3(3,0) Exploration of the current problems and issues associated with the health of population groups. The interrelationships of biological, socio-cultural, behavioral, environmental, political, and economic risk factors and the health and illness patterns of those in population groups are examined. *Preq:* HLTH 298, 380 or consent of instructor.

HLTH 320 Health Maintenance for Men 3(3,0) Exploration of the specific health maintenance needs of men, with emphasis on understanding and preventing problems of men's health. Health majors and minors will be given enrollment priority. *Preq:* Two-semester sequence in science or consent of instructor.

HLTH 340 Health Promotion and Education 3(3,0) Application of learning, change, and group theories as interventions for health behaviors. *Preq:* HLTH 240, 298.

HLTH H341 Health Promotion Seminar 1(2,0) Seminar exploring in-depth topics and problems presented in HLTH 340, utilizing appropriate models, such as PRECEDE/PROCEED, to analyze health-promotion strategies. To earn honors credit, students must be enrolled in HLTH 340 and earn a B or higher in both courses. *Coreq:* HLTH 340.

HLTH 350 Medical Terminology and Communication 3(3,0) Skills in building, analyzing, defining, pronouncing, and spelling medical terms related to the human body are developed and applied through electronic communication. *Preq:* Junior standing or permission of instructor.

HLTH 380 Epidemiology 3(3,0) Introduction to epidemiological principles and methods utilized in the study of the origin, distribution, and control of disease. Health majors and minors will be given enrollment priority. *Coreq:* Approved statistics course.

HLTH H381 Epidemiology Seminar 1(2,0) Provides students with the opportunity to use epidemiological principles and methods learned in HLTH 380 to analyze research findings and apply the findings to health promotion. To earn honors credit, students must be enrolled in the corequisite HLTH 380 and earn a B or higher in both courses. *Preq:* Approved statistics course. *Coreq:* HLTH 380.

HLTH 398 Health Appraisal Skills 1(0,3) Utilizes laboratory experiences to measure health risk, interpret laboratory health data, and design personal health programs. Restricted to Health Science majors. *Preq:* HLTH 298.

HLTH 400, 600 Selected Topics in Health 1-3(1-3,0) Topics selected to meet special and individualized interest of students in health. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Consent of instructor, Junior standing.

HLTH 401, 601 Health Consumerism 3(3,0) Exploration of consumer decisions regarding health products and services with emphasis on strategies for decision making. Health majors and minors will be given enrollment priority. *Preq:* Two-semester sequence in science or consent of instructor.

HLTH 402 Principles of Health Fitness 3(3,0) Students apply current theories concerning physiological effects of exercise to select new populations; understand the relationship between exercise and various chronic diseases; and design, execute, and evaluate exercise programs in terms of safety and effectiveness. *Preq or Coreq:* HLTH 305, CPR certification.

HLTH 410, 610 Concepts of Health for Children 3(3,0) Focus on the analysis and evaluation of health problems commonly occurring in children. Emphasis is on concepts of positive health behavior. Health majors and minors will be given enrollment priority. *Preq:* Developmental psychology requirement.

HLTH 411, 611 Health Needs of High Risk Children 3(3,0) Analysis and evaluation of the health needs of high-risk families and special needs children are developed from the prenatal period to age six. Emphasis is on health prevention and early intervention strategies. Early Intervention Specialist minors will be given enrollment priority. *Preq:* HLTH 410.

HLTH 412 Economics and Financing of Health Systems 3(3,0) Focus on economic and finance issues in health and medical care. Examines special market characteristics of the health sector, the demand for health services, market behavior of health care firms, functioning of insurance markets, and the economic impact of technology on health care costs and financing.

HLTH 415, 615 Public Health Issues in Obesity and Eating Disorders 3(3,0) In-depth review of prevalence, risk factors, consequences, and treatments of obesity and other eating disorders. Focuses on the public health importance of cultural norms, prevention, and early intervention as it relates to obesity and eating disorders. *Prq:* Junior standing in Health Science or consent of instructor.

HLTH 420, 620 Health Science Internship 1-6(0,3-18) Under competent supervision in an approved agency, students have the opportunity for on-the-job experiences. Students select an agency and develop personal goals and objectives appropriate to the setting, population, and health issues. May be repeated for a maximum of six credits. To be taken Pass/Fail only. *Prq:* Minimum grade-point ratio of 2.5, consent of instructor, and Junior standing.

HLTH 430, 630 Health Promotion of the Aged 3(3,0) Focuses on analysis and evaluation of health issues and health problems of the aged. Emphasis is on concepts of positive health behaviors. Health majors and minors will be given enrollment priority. *Prq:* Developmental psychology; two-semester sequence in science; or consent of instructor.

HLTH 431, 631 Public and Environmental Health 3(3,0) Principles of environmental health, with emphasis on understanding various health concerns created by the interactions of people with their environment. Students evaluate the impact of environmental factors on public health policy decisions. Meets specific area of need in environmental health issues.

HLTH 440 Managing Health Service Organizations 3(3,0) Exploration of the role of the health professional as a leader and activist. Study of legal, ethical, economic, political, and agent roles. *Prq:* Junior standing or permission of instructor.

HLTH 450, 650 Applied Health Strategies 3(3,0) Students plan, implement, and evaluate strategies to promote health through individual behavior changes. Both healthful and unhealthful behaviors are included. Examples include smoking cessation, weight management, and stress management. Restricted to Health Science majors. *Prq:* HLTH 480.

HLTH 460 Health Information Systems 3(3,0) Focus on the application of information systems to patient care and management support systems. Provides a general understanding of how the information needs of health professionals and health service organizations can be met through the proper acquisition, storage, analysis, retrieval, and presentation of data.

HLTH 470 International Health 3(3,0) Deepens students' knowledge of global health and how public health work is conducted internationally. Introduction to assessment of international health needs and designing, implementing, managing, and evaluating public health programs in international settings. *Prq:* HLTH 298.

HLTH 475 Health Systems Research 3(3,0) Advanced training in health systems research methods, models, and objectives. Emphasizes methods of health systems research with quantitative data analysis, interpretation, and the application of results to health systems improve-

ment. *Prq:* Senior standing in Health Systems Research concentration area.

HLTH 480 Community Health Promotion 3(3,0) Focus on health-promotion activities for community and population groups with emphasis on assessment, program planning, and evaluation. Restricted to Health Science majors. *Prq:* HLTH 340, 380, 398.

HLTH481 Community Health Promotion Seminar 1(2,0) Students evaluate health-promotion strategies and differentiate theory and practice by examining classroom content and field experience. To earn honors credit, students must be enrolled in HLTH 480 and earn a B or higher in both courses. *Prq:* HLTH 340, H341. *Coreq:* HLTH 480.

HLTH 490 Research and Evaluation Strategies for Public Health 3(3,0) Discussion of research in health. Focus on analysis of reported research. Ethical, moral, and legal issues are discussed. *Prq:* *Coreq:* HLTH 380; statistics requirement.

HLTH 491 Research Internship 1(0,3) Students collaborate in on-going faculty research programs to gain an awareness of the research process and role in a unique mentoring environment. Students apply theories and principles learned in HLTH 490 as they mentor with faculty. To earn honors credit, students must be enrolled in HLTH 490 and earn a B or higher in both courses. *Coreq:* HLTH 490.

HLTH 498, 698 Improving Population Health 3(3,0) Critical examination of current and emerging issues in improving public health practice and population health. Covers examples in empirical and applied research, revealing future trends in population health. Health Science majors and minors will be given enrollment priority. *Prq:* HLTH 240, 298, 380, or consent of instructor.

HISTORY

Professors: J. L. Arbena, C. K. Bleser, H. R. Grant, *Chair:* T. J. Kuehn, D. M. McKale, E. E. Moise, D. M. Nicholas, J. V. Reel, Jr., A. Schaffer, H. L. Suggs; *Associate Professors:* E. D. Carney, C. A. Grubb, P. E. Mack, S. G. Marks, R. L. Saunders, Jr., W. F. Steiner, Jr.; *Assistant Professors:* S. L. Barczewski, E. R. Dale, R. R. Owens, S. M. Sinke; *Visiting Instructor:* M. S. Silvestri

HIST 100 Higher Education and Clemson 1(1,0) Introduction to higher education; its background and development in the western world, emphasizing land-grant institutions and Clemson University in particular.

HIST 101, H101 History of the United States 3(3,0) Political, economic, and social development of the American people from the period of discovery to the end of Reconstruction.

HIST 102, H102 History of the United States 3(3,0) Political, economic, and social development of the American people from the end of Reconstruction to the present.

HIST 122, H122 History, Technology, and Society 3(3,0) Topics in the history of technology with emphasis on how technology affects society and how society shapes technology. Emphasis is on 19th and 20th century America, but some material from other periods of Western Civilization and other world regions may be discussed.

HIST 172, H172 Western Civilization 3(3,0) Political, economic, and social movements of Western civilization from ancient times to the 17th century.

HIST 173, H173 Western Civilization 3(3,0) Political, economic, and social movements of Western civilization from the 17th century to the present.

HIST 198 Current History 1(1,0) Examination of the major events and problem areas in the news with emphasis on their historical context and possible long-range significance. May be repeated for a total of three credits. Does not count toward the requirements of the major or minor in History.

HIST 200 Fort Hill Internship 1(0,1) Provides practical experience in public history museum work and historical preservation. May be repeated for a total of three credits. Cannot count toward the major or minor in History. To be taken Pass/Fail only. *Prq:* Consent of department chair.

HIST 300 History of Colonial America 3(3,0) Development of American institutions and customs in the period before 1776. Considerable emphasis is placed on the imperial relations between Great Britain and her colonies and upon the movement towards and the philosophy of the American Revolution.

HIST 301 American Revolution and the New Nation 3(3,0) Study of the various historical explanations leading to an understanding of the American Revolution, the establishment of the Nation under the Constitution, and the first decade of the new nation. Special emphasis is on developing an understanding of individual motivation and ideological development present during the last four decades of the 18th century.

HIST 302 Age of Jefferson, Jackson, and Calhoun 3(3,0) Formation and growing pains of the new nation through the Federal and Middle periods of its history, with emphasis on economic and political development, the westward movement, and the conflicting forces of nationalism and sectionalism.

HIST 303 Civil War and Reconstruction 3(3,0) Study of the political, military, and social aspects of the sectional conflict and of the era of Reconstruction. Some emphasis is placed on the historical controversies which the period has inspired.

HIST 304 Industrialism and the Progressive Era 3(3,0) Study of American society in the period between the 1880s and 1930s. Emphasizes the effects of industrialization and urbanization on the American people.

HIST 305 The United States in the Age of the World Wars 3(3,0) Examination of the changes in the American experiences through two world wars, a depression, the Prohibition era, and the assumption of international responsibilities.

HIST 307 Recent America 3(3,0) Examination of the American experience from the end of World War II through the period of the Korean and Vietnam wars, the Cold War, the Civil Rights movement, the counter-culture of the 1960s, assassinations, and Watergate.

HIST 311 African Americans to 1877 3(3,0) Study of the African-American experience in the United States, from the African past through slavery to 1877.

HIST 312 African American History from 1877 to the Present 3(3,0) Study of African American experience in the United States, from 1877 to the present.

HIST 313, H313 History of South Carolina 3(3,0) Political, economic, and social development of South Carolina from 1670 to the present.

HIST 314 History of the South 3(3,0) Origins and development of political, economic, and cultural institutions of the South from the Colonial period to the present and the role of the South in the nation's development.

HIST 316 American Social History 3(3,0) Study of American society, including the relationship among classes, ethnic groups, regions, and sexes, from the Colonial period to the present.

HIST 318 History of American Women 3(3,0) Survey course of the history of American women emphasizing the changing role of women in American culture and society.

HIST 321 History of Science 3(3,0) Survey of the development of science in the Western world, emphasizing the period from the Renaissance to the present.

HIST 322 History of Technology 3(3,0) Formerly HIST 309. History of the major developments in Western technology and their relationships to the societies and cultures in which they flourished.

HIST 323 History of American Technology 3(3,0) Formerly HIST 310. History of developments in technology and their role in American life with particular emphasis on the American Industrial Revolution and the 20th century.

HIST 325 American Economic Development 3(3,0) Formerly HIST 306. Economic development of the United States from Colonial to recent times, emphasizing the institutional development of agriculture, banking, business and labor, and government regulations and policy.

HIST 327 American Business History 3(3,0) Survey of the history of American business using a case-study approach. Focus is on the effects that policies and institutions have on individual businesses.

HIST 328 United States Legal History to 1890 3(3,0) Survey of American legal system in its historical perspective from Colonial times to 1890. Emphasis is on the relationship between law and society, the way in which the practice of law changed American society, and the way in which social development affected both the theory and practice of the law.

HIST 329 United States Legal History Since 1890 3(3,0) Examination of the social, cultural, intellectual, economic, and political forces that have helped shape the law in the United States since 1890.

HIST 330 History of Modern China 3(3,0) Growth and development of Chinese civilization from ancient times to the present. Emphasis is on 20th century China, particularly since the rise to power of the Communist regime.

HIST 333 History of Modern Japan 3(3,0) Origin and development of Japanese civilization with particular emphasis on modern Japan from mid-19th century to the present.

HIST 338 African History to 1875 3(3,0) Study of sub-Saharan Africa from antiquity to European

colonial rule, exploring the development of Stone Age cultures; agricultural and pastoral societies; ancient civilizations; political, economic, and social systems; gradual shift of initiative from the interior to the coast; and various slave trades.

HIST 339 Modern Africa, 1875 to the Present 3(3,0) Study of sub-Saharan Africa from 1875 to the present, with the focus placed upon the development and decline of European imperialism, dilemmas of African independence, and ethnic struggles in Southern Africa.

HIST 340 Ancient Americans 3(3,0) Introduction to the geography of the Western Hemisphere; origin of human life in the Americas; structure and accomplishments of the major pre-Columbian societies, with emphasis on the rise and decline of the Classic civilizations; the impact of the European conquest; the formation of a new Ibero-American culture.

HIST 341 Modern Mexico 3(3,0) Introduction to the geography of the region, origins, and progress of the Independence movements and political, economic, and social developments after 1825; current domestic and international problems.

HIST 342 South America Since 1800 3(3,0) Introduction to the geography of the region; origins and progress of the Independence movements; political, economic and social developments after 1825; current domestic and international problems.

HIST 351 Ancient Near East 3(3,0) History of the peoples and civilizations of the Near East from the Sumerians to the establishment of Roman power in this region. Geography, mythology, religious, and economic currents, as well as the methods and discoveries of archaeology are included.

HIST 352 Egypt in the Days of the Pharaohs 3(3,0) Egyptian civilization from its beginning until the period of Roman conquest. Includes a survey of political history, but also deals with daily life, making much use of archaeological evidence.

HIST 354 The Greek World 3(3,0) Study of Greek civilization from its beginning until the time of the Roman conquest, concentrating on the social institutions of the Greek city-states.

HIST 355 The Roman World 3(3,0) The rise of Rome to world empire and the international civilization it dominated. Concentration on the nature of the political change from Republic to monarchy with particular emphasis on city life and the causes of its decline.

HIST 361 History of England to 1688 3(3,0) Evolution of English political, social, economic, and cultural institutions to the 17th century. (Study Abroad)

HIST 363 History of England Since 1688 3(3,0) Evolution of English political, social, economic, and cultural institutions from the 17th century to the present.

HIST 365 English Cultural History 3(3,0) [W.2] Survey of the cultural history of England, from Anglo-Saxon times to the present, focusing on the period after the English Renaissance.

HIST 370 Medieval History 3(3,0) Survey of the period from the eclipse of Rome to the advent of the Renaissance, emphasizing human migrations, feudalism, rise of towns, and cultural life.

HIST 372 The Renaissance 3(3,0) Examination of the transitional period of European civilization (ca. 1300–1500), with emphasis on institutional, cultural, and intellectual developments.

HIST 373 Age of the Protestant Reformation 3(3,0) Evolution of Modern Europe (ca. 1500–1660), as affected by the Reformation, wars of religion, and growth of nation-states. Study includes intellectual advances and the beginnings of European expansion overseas.

HIST 374 Europe in the Age of Reason 3(3,0) Study of the quest for order and the consolidation of the European state system between 1660 and 1789 with emphasis on the idea of absolutism, the question of French hegemony, and the synthesis of the 18th-century Enlightenment.

HIST 375 Revolutionary Europe 3(3,0) History of Europe from the outbreak of the French Revolution through the Revolutions of 1848, with emphasis on the conflict between the forces of change and those of conservatism, within the states and in Europe in general.

HIST 377 Europe, 1914–1945 3(3,0) Focus on Europe during two major wars and the peacetime adjustments Europeans made, or failed to make, during the twenty-year interim between those wars.

HIST 378 Europe Since 1945 3(3,0) Focus on how World War II completed the destruction of European global hegemony, creating a bipolar continent with the west dominated by the United States and the east by Soviet Russia; and how Europe adjusted to this situation.

HIST 380 Imperial Germany 3(3,0) German history from the beginning of the German Empire, 1870–71, through World War I. Emphasizes the influence of militarism, nationalism, anti-Semitism and xenophobia on the German culture and political process.

HIST 381 Germany Since 1918 3(3,0) German history from the time of Germany's defeat in World War I, through the Nazi period and World War II. Culminates with the study of a divided Germany.

HIST 384 History of Modern France 3(3,0) French history from mid-19th century to the present with particular emphasis on France since 1900.

HIST 385 History of Imperial Russia 3(3,0) Survey of the formative years of the Russian Empire from the time of accession of Peter the Great to the time of the Russian Revolution. Social, political, diplomatic, and intellectual developments are given equal treatment.

HIST 386 History of the Soviet Union 3(3,0) Soviet history from the revolution to the present. Surveys the creation and subsequent development of the communist political and social system, with attention given to culture and diplomacy.

HIST 387 The Russian Revolution 3(3,0) History of one of the most formative series of events of the 20th century. Follows the crisis of Imperial Russia, its downfall during World War I, and subsequent revolutionary upheaval leading to the formation of the USSR.

HIST 390 Modern Military History 3(3,0) Survey of the development of modern warfare and the influence of technological change on warfare. Particular attention is given to the major conflicts of the 20th century.

HIST 391 Post World War II World 3(3,0) The world in the age of the Cold War, the breakdown of the colonial empires, and racial, religious, ethnic, national, and social tensions. The United States provides the central core to the class.

HIST (F&RR) 392 History of the Environment of the United States 3(3,0) Examination of the historical development of the attitudes, institutions, laws, people, and consequences that have affected the environment of the United States from pre-Columbian days until the present. Emphasis is placed on the interaction of human beings within and with the environment.

HIST 393 Sports in the Modern World 3(3,0) Analysis of the global evolution and diffusion of sports in the industrial age, with an emphasis on the linkage of sports structure and performance to the larger social context.

With departmental consent, any 400- or 600-level course in history may be repeated once for credit. The 400-level courses require students to do historical research and writing.

HIST 400, 600 Studies in United States History 3(3,0) Topics and problems in the history of the United States from the Colonial era to the present.

HIST 438, 638 Problems in African Historiography and Methodology 3(3,0) Concentrates on major issues in the field of African history with an additional focus on methodological concerns.

HIST 440, 640 Studies in Latin American History 3(3,0) Consideration of selected and varied topics in Latin American history through readings, class discussions, and individual or group projects. Special attention is given to the use of an inquiry or problem-solving method of historical analysis and to the cultivation of a comparative perspective.

HIST 450, 650 Studies in Ancient History 3(3,0) Selected topics in the field of ancient history ranging from pre-Biblical times to the fall of the Roman Empire.

HIST 460, H460, 660 Studies in British History 3(3,0) Examination of selected themes, topics, or periods in British history from Anglo-Saxon times to the present.

HIST 470, 670 Studies in Early European History 3(3,0) Study of selected topics or themes in European history from the fall of the Roman Empire to the age of industrialization.

HIST 471, H471, 671 Studies in Modern European History 3(3,0) Study of selected topics or problems in European history from the end of the Old Regime to the present.

HIST 490 Senior Seminar 3(3,0) Seminar in current research themes in history. Students do directed research on a particular topic. Seminar topics vary from section to section and from semester to semester. *Preq:* Senior standing or consent of instructor.

HIST 491, H491, 691 Studies in the History of Science and Technology 3(3,0) Selected topics in the development of science and technology, with emphasis on their social, political, and economic effects.

HIST 492, 692 Studies in Diplomatic History 3(3,0) Selected topics and problems in international conflict and conflict resolution among nations. Concentration is usually in 20th century history.

HIST 493, 693 Studies in Social History 3(3,0) Studies in the ways people have earned their livings and lived their lives, individually and as communities, in the confines of different societies.

HIST 494, 694 Studies in Comparative History 3(3,0) Selected topics in comparative history, contrasting and comparing similar historic developments in different nations, geographic areas, or civilizations.

HIST 495, 695 Studies in the History of Ideas 3(3,0) Selected topics and themes in the development of ideas that have had an impact on the behavior of individuals and civilizations.

HIST 496, 696 Studies in Legal History 3(3,0) Study of selected problems in the development of law and the system of criminal and civil justice.

HIST H497 Senior Honors Research 3(3,0) Research for the preparation of senior honors thesis. *Preq:* Senior standing and successful completion of a 400-level history course and approval of the Department of History.

HIST H498 Senior Honors Thesis 3(3,0) Writing of the senior honors thesis. *Preq:* HIST H497.

HIST 499 Independent Study 1-3(1-3,0) Study of selected problems in history under the direction of a faculty member chosen by the student. Student and faculty member develop a course of study designed for the individual student and approved by the department chair prior to registration.

HORTICULTURE

Professors: D. W. Bradshaw, R. G. Halfacre, M. T. Haque, B. B. Rhodes, T. Whitwell, *Chair; Associate Professors:* W. V. Baird, J. D. Caldwell, A. J. Pertuit, Jr.; *Assistant Professor:* R. L. Hassell

HORT 101 Horticulture 3(3,0) Environmental factors and horticultural practices affecting optimum production of floral, fruit, ornamental, and vegetable crops. Survey of the various areas of horticulture and their importance to society.

HORT 202 Selected Topics 1-3(1-3,0) Introduction to developing trends/concepts/technologies in horticulture. May be repeated for a maximum of three credits or a maximum of three credits in combination with HORT 400, but only if different topics are covered. *Preq:* Consent of instructor.

HORT 208 Landscape Appreciation 3(3,0) Deepens students' appreciation of our natural and built environments through a study of landscape elements, styles, and professions. Landscapes ranging in scale from residential to regional are critiqued, and design principles and landscape ethics are discussed.

HORT 271 Internship 1-6(0,2-12) Preplanned, practical, and supervised work experience to give beginning students on-the-job learning opportunities that support their classroom experience. Students submit monthly reports and present a departmental internship seminar. Undergraduates may accumulate a maximum of six credits for participation in HORT 271 and/or 471. *Preq:* Consent of instructor.

HORT 303 Plant Materials 3(2,3) Woody, ornamental plants and their aesthetic and functional uses in landscape developments. Study covers habit of growth, ultimate size, texture effect, period of bloom, color, and cultural requirements.

HORT 304 Annuals and Perennials 3(2,3) Annual and perennial flowers' aesthetic appeal and functional uses and needs. Color, texture, bloom time, form, size, and growth requirements as they relate to designing, planting, and maintaining colorful landscapes. *Preq:* HORT 208, 303, or consent of instructor.

HORT 305 Plant Propagation 3(2,3) All phases of plant propagation from seeds, bulbs, divisions, layers, cuttings, budding, and other types of grafting are comprehensively treated. Timing, manner, and material for making cuttings; temperature and media requirements and propagation structures for rooting cuttings of ornamental and fruit trees, shrubs, and indoor plants are studied.

HORT 308 Landscape Design 4(3,3) Landscape planning of residential and public properties in order to achieve best use and most enjoyment from a given piece of ground. *Preq:* HORT 208, 303, or consent of instructor.

HORT (FOR) 309 Arboriculture—Tree Care and Maintenance 3(3,0) See FOR 309.

HORT 310 Greenhouse Crop Physiology 3(2,3) Physiology, growth, and development of floriculture crops in fully or semi-controlled environments, including manipulation of flowering, chemical and environmental height regulation, fertility in artificial substrates, scheduling, cost analysis, and pest management. *Preq:* CSENV 202, HORT 101, or consent of instructor.

HORT 352, 652 Tree Fruit Culture and Physiology 3(2,3) Fruit bud formation, rest period, and water relations of fruit plants, soils, fruit setting; orchard soil management and responses of various fruits to fertilizers; principles of pruning, effect of climatic differences, freezing of tissues, and means of avoiding injury; harvesting, transportation, and storage. *Preq:* HORT 101 or consent of instructor.

HORT 400 Selected Topics 1-3(1-3,0) In-depth examination of developing trends/concepts/technologies in horticulture. May be repeated for a maximum of three credits or a maximum of three credits in combination with HORT 202, but only if different topics are covered. *Preq:* Junior standing or consent of instructor.

HORT 406, 606 Nursery Technology 3(2,3) Principles and techniques in handling nursery crops. *Preq:* HORT 303, 305.

HORT 408 Special Problems in Horticulture 1-3(0,3-9) Independent investigation in horticulture. Emphasis is on organizing a quality proposal, conducting the investigation, and reporting of findings at a professional society meeting and/or in a professional publication. Cumulative maximum of three credits. *Preq:* Minimum of 75 hours completed and consent of instructor.

HORT 409 Seminar 1(1,0) Recent research work on various phases of horticulture, methods of conducting investigations, and preparation of report of investigations.

HORT 412, 612 Turfgrass Management 3(2,3)F Studies of warm and cool season turfgrasses in relation to value, use, regional adaptation, establishment, soils, and cultural practices. Influence of environmental, cultural, and genetic factors on turf quality and serviceability. Identification of grass and weed species and discussion of programs for the management of lawns, parks, roadsides, and golf courses. *Prq:* BIOL 103 or equivalent.

HORT 416 Floral Design 2(1,3)F Topics include simple arrangements (history, containers, mechanical aids, etc.), arrangements for specific occasions, church arrangements, funeral designs, bride's bouquets, dried arrangements and flower preservation, corsage work, foliage arrangements, bonsai, terrarium, Christmas wreaths, and foliage plant identification. *Prq:* BIOL 103 or equivalent.

HORT (CSENV) 433, 633 Integrated Weed Management for Agronomic and Horticultural Crops 3(2,2)S Weed management systems consisting of cultural, chemical, and biological methods are studied for the major agronomic and horticultural crops of South Carolina with problem-solving methodology and herbicide injury diagnosis. *Prq:* CSENV 407 or equivalent introductory weed science.

HORT 455, 655 Small Fruit Crops 3(2,3)F In-depth survey of taxonomical, morphological, and physiological characteristics of small fruit crops as they relate to the study of horticultural characteristics, culture, production, harvesting, and handling of both commercial and home-grown grapes, blueberries, strawberries, brambles, and kiwifruit. *Prq:* HORT 101 or consent of instructor.

HORT 456, 656 Vegetable Crops 4(3,3)F Principles and practices employed in the commercial growing and marketing of vegetable crops with emphasis on plant characteristics, cultivars, management practices, harvest, quality factors and grading, storage, economic importance, and areas of production.

HORT 461, H461, 661 Problems in Landscape Design 4(3,3)S Landscape planning for larger residential properties, schools, industrial plants, real estate developments; detailed finished plans; further study of materials used, original problems; field study. *Prq:* HORT 308, 407, or consent of instructor.

HORT (BIOSC) 465, 665 Plant Molecular Biology 3(3,0) See BIOSC 465.

HORT 470, 670 Horticulture and Human Well-Being 3(2,3)S Role of horticulture in human well-being (physical and mental) is emphasized. Adaptive horticultural techniques and activities suitable for individuals with special needs (impaired, disabled, handicapped) are presented. Students plan, perform, and report on supervised and independent horticultural activities with selected special individuals or groups.

HORT 471, 671 Advanced Internship 1-6(0,2-12) Preplanned work experience under competent supervision in approved agency dealing with horticultural endeavors. Gives advanced students on-the-job learning opportunities to apply acquired knowledge and skills. Monthly reports and final departmental seminar required. Undergraduates may accumulate a maximum of six credits for participation in HORT 271 and/or 471. *Prq:* Junior standing and consent of instructor.

HORT 472, 672 Garden Experiences in Youth Development 2(1,3) Exploration of the role of gardening and related outdoor experiences in enhancement of educational development, self-esteem and pro-social behavior in elementary school children. *Prq:* Senior standing and consent of instructor.

HOSPITAL AND HEALTH SERVICES ADMINISTRATION

H ADM 408, 608 Hospital and Health Services Administration 3(3,0) Survey of how hospital and health-care administration is practiced within the United States. Topics include planning; social, legal, and political considerations; alternate forms of organization; management practices; control systems; and trends/issues facing the future of health-care administrators. *Prq:* Senior or graduate-level standing or consent of instructor.

H ADM 410, 610 Hospital Internship 3(0,9) Students spend nine hours per week on a specified program of observing, practicing, and experiencing the duties of hospital administrators in selected local hospitals. Course is specifically outlined along with the amount of time the student will spend in each phase or department of the hospital. Student progress is constantly monitored by University faculty and hospital staff. *Prq:* H ADM 408.

HUMANITIES

Professor: S. K. Eisinger, Associate Professor: A. Bennett

HUM 301 Humanities 3(3,0) Introduction to humanistic studies focusing on relationships among disciplines—painting, sculpture, architecture, music, literature, philosophy, and drama—beginning with prehistory and continuing to the Renaissance.

HUM 302 Humanities 3(3,0) Introduction to humanistic studies focusing on relationships among disciplines—painting, sculpture, architecture, music, literature, philosophy, and drama—beginning with the 17th century and continuing to the present.

HUM 306 Creative Genius in Western Culture 3(3,0) Investigation of creativity through study of great innovators in art, literature, music, and ideas. May be repeated once for credit.

HUM 309 Studies in Humanities 3(3,0) Interdisciplinary approach to the humanities. Special subject matter varies according to the instructor and as approved by the head of the English Department. May be repeated once for credit.

HUM (ENGL) 456 Literature and Arts of the Holocaust 3(3,0) See ENGL 456.

INDUSTRIAL ENGINEERING

Professors: R. P. Davis, W. J. Kennedy, D. L. Kimbler, Chair; M. S. Leonard; Associate Professors: W. G. Ferrell, Jr., J. S. Greenstein; Assistant Professors: B. R. Cho, A. K. Gramopadhye, B. J. Melloy

I E 201 System Design 1 4(3,3) Introduction to the design of industrial engineering systems. Design methodologies are introduced in the context of a design process that includes identifying user needs; developing a design specification; generat-

ing, evaluating, refining, and selecting design concepts; detail design; constructing, testing, and refining prototypes; and delivering the product to the customer. *Prq:* ENGR 120.

I E 210 Design and Analysis of Work Systems 4(3,3) Facilities planning and design, workplace design, ergonomics of workplace design, performance measurement and methods engineering. *Coreq:* MTHSC 302.

I E H300 Junior Honors Seminar 0 Acquaints students enrolled in the Industrial Engineering Departmental Honors Program with current research issues in the profession. This assists students in preparing a research proposal for the senior thesis. *Prq:* Admission to Departmental Honors Program and Junior standing.

I E 320 Design of Information Systems in Industrial Engineering 3(2,3) [C.2] Introduction to object-oriented programming principles and their use in human-centered system design. *Prq:* ENGR 120.

I E 340, H340 Systems and Flows 3(2,3) Systems concepts; modeling, design, and analysis of network flows involving material and information in production and service systems. *Prq:* MTHSC 208, M E 310.

I E 361 Industrial Quality Control 4(3,3) Quality engineering techniques focusing on process control using statistical methods including control charts and acceptance sampling. *Prq:* MTHSC 302.

I E 374 Advanced Manufacturing Systems 3(3,0) Study of state-of-the-art automated manufacturing systems, CAD/CAM, computer-integrated manufacturing, advanced 3-D computer controlled machining systems, adaptive control, group technology, and flexible manufacturing systems. *Prq:* I E 210.

I E 380 Methods of Operational Research I 3(3,0) Introduction to operations research models, including linear programming, integer linear programming, transportation and assignment problems, and network flows. *Prq:* MTHSC 206.

I E 381 Methods of Operational Research II 3(3,0) Probabilistic modeling of engineering systems. Topics include calculus-based probability, decision analysis, Markov processes, queueing, and reliability. *Prq:* MTHSC 208 and 302. *Coreq:* I E 384.

I E 384, H384 Engineering Economic Analysis 3(3,0) Basic principles and techniques of economic analysis of engineering projects. Consideration of time value of money, short- and long-term investments, replacement analysis, depreciation methods, cost allocation, and measures of cost effectiveness. *Prq:* MTHSC 108.

I E 452, 652 Reliability Engineering 3(3,0) Probabilistic approach to assessing system reliability. Methods for analyzing serial, parallel, and complex systems. Reliability life testing and its acceleration are covered. Essential elements of maintainability are identified and related to system availability. *Prq:* MTHSC 206 and 302 or consent of instructor.

I E 460, H460, 660 Quality Improvement Methods 3(3,0) Study of modern quality improvement techniques presented in an integrated, comprehensive context. *Prq:* Senior standing.

I E 461, 661 Quality Engineering 3(3,0) Design aspects of quality and the engineer's role in problems of quality in production systems. *Prq:* I E 361.

IE 465, H465, 665 Facilities Planning and Design 3(3,0) Study of the principles and techniques of plant layout. Economic selection of materials handling equipment and integration of this equipment into the layout plan to provide effective product flow. Quantitative techniques for evaluation of facilities plans. A design project is required. *Prq:* IE 210 and 380 or consent of instructor.

IE 467 System Design II 3(2,3) Provides the student with the challenge of integrating and synthesizing general engineering knowledge into creatively solving real-world, open-ended problems. This includes developing the problem statement, objectives, and criteria; data collection; technical analysis; developing and integrating recommendations; and presenting results. *Prq:* IE 201, 210, 320, 340, 361, 380, 381, 384.

IE 468 Design Problems in Industrial Engineering 1(1,0) Seminar to accompany IE 467. Industrial engineering case studies are explored with emphasis on integrating appropriate analysis tools and design techniques to achieve rational and functional solutions. *Prq:* Concurrent enrollment in IE 467.

IE 482, 682 Systems Modeling 3(3,0) Modeling of discrete industrial systems using a digital computer. The purpose, theory, and techniques of system modeling are presented. *Prq:* IE 381 and MTHSC 302 or consent of instructor.

IE (B, E, EE&S) 484, 684 Municipal Solid Waste Management 3(3,0) See EE&S 484.

IE 485, 685 Industrial Systems Engineering 3(3,0) Modeling and analysis of multistage decision processes, recursive optimization, process and system design, and control problems. *Prq:* IE 380 and 381 or consent of instructor.

IE 486, H486, 686 Production Planning and Control 3(3,0) Fundamentals of forecasting demand, scheduling production, and controlling the movement and storage of material associated with production are studied. State-of-the-art manufacturing techniques are discussed. A design project is required. *Prq:* IE 380 and 384.

IE 487, 687 Industrial Safety 3(3,0) Recognition and prevention of hazards. Recognition and control of hazardous materials. Developing and managing a safety program. Designing inherently safe equipment and workplaces. *Prq:* Junior standing.

IE 488, 688 Human Factors Engineering 3(3,0) Introduction to design for human use. Information about human performance, abilities, and limitations is surveyed and applied to the design of tools, machines, facilities, tasks, and environments for efficient, safe, and comfortable human use. *Prq:* IE 210 or consent of instructor.

IE 491, H491, 691 Selected Topics in Industrial Engineering 1-3(0-3,0-9) Comprehensive study of any timely or special topic in industrial engineering not included in other courses. May be repeated for a total of six credits. *Prq:* Consent of instructor.

IE 492, H492, 692 Design Topics in Industrial Engineering 1-3 Comprehensive study of any timely or special design topic in industrial engineering. May be repeated for a total of six credits. *Prq:* Consent of instructor.

INTEGRATED PEST MANAGEMENT

Professor: J. A. Brittain

IP M 401, 601 Principles of Integrated Pest Management 3(3,0) Origins, theory, and practice of integrated pest management. Relationships among crop production and protection practices are explored. Economics of various control strategies are considered. Integrated pest management field projects are studied. Conventional and integrated pest management approaches are compared. Multidisciplinary plant problem analysis is introduced. *Prq:* CSENV 407, ENT 301, PL PA 401, or consent of instructor.

ITALIAN

Assistant Professor: B. M. Zaczek; *Visiting Assistant Professor:* R. F. Lanzoni

ITAL 101 Elementary Italian 4(3,1) Introductory course stressing grammar, pronunciation, oral practice, and reading skills. Attention is given to practical everyday living as well as cultural considerations.

ITAL 102 Elementary Italian 4(3,1) Continuation of ITAL 101. *Prq:* ITAL 101 or consent of instructor.

ITAL 201, H201 Intermediate Italian 3(3,0) Intermediate course to build on the foundation of previous language courses, with practice in listening, speaking, reading, and writing. Introduction to cultural perspectives through readings of literary prose selections. *Prq:* ITAL 102.

ITAL 202, H202 Intermediate Italian 3(3,0) Increasingly difficult readings in Italian literature, supplemented with classroom discussions and compositions. *Prq:* ITAL 201.

ITAL 301 Introduction to Italian Literature 3(3,0) Study of selected texts of Italian literature in their artistic, cultural, and social context. May include theme and genre studies. *Prq:* ITAL 202 or consent of department chair.

ITAL 302 Modern Italian Literature 3(3,0) Study of selected works from major 19th and 20th century Italian authors, including Manzoni, Verga, Svevo, Moravia, Ginzburg. *Prq:* ITAL 202 or consent of department chair.

ITAL 305 Intermediate Italian Conversation and Composition 3(3,0) Practice in the written and spoken language with emphasis on vocabulary, pronunciation, and comprehension. *Prq:* ITAL 202 or consent of department chair.

ITAL 307 Italian Civilization and Culture 3(3,0) Study of the significant aspects of Italian civilization and culture through analysis of literary texts, paintings, films, and magazine articles. *Prq:* ITAL 202 or consent of department chair.

ITAL 398 Directed Reading 1-3(1-3,0) Directed study of selected topics in Italian literature, language, and culture. May be repeated for a total of six credits. *Prq:* Consent of department chair.

ITAL 400 Image of an Italian City 3(3,0) Study of historical, social, and architectural images of Italian cities through analysis of literary texts and films. *Prq:* ITAL 202 or consent of instructor.

JAPANESE

Associate Professor: T. Kishimoto; *Visiting Instructor:* R. C. Arlaucks

JAPN 101 Elementary Japanese 4(3,1) Course for beginners. Fundamentals are taught, and a foundation is provided for further study and the eventual ability to read and speak the language. The Japanese writing system is introduced. Students learn how to recognize and write the two alphabets HIRAGANA and KATAKANA. Three hours a week of classroom instruction and one hour a week in the language laboratory.

JAPN 102 Elementary Japanese 4(3,1) Continuation of JAPN 101. Students study Kanji characters. *Prq:* JAPN 101.

JAPN 201 Intermediate Japanese 3(3,0) Brief review of JAPN 101 and 102, with conversation, composition, and beginning of more serious reading of Japanese in short stories. Students study Kanji characters. *Prq:* JAPN 102.

JAPN 202 Intermediate Japanese 3(3,0) Brief review of JAPN 201, with conversation, composition, and dictation based on more difficult Japanese reading selections; includes a continuation of Kanji characters. *Prq:* JAPN 201.

JAPN 305 Japanese Conversation and Composition 3(3,0) Practice in the spoken language with emphasis on vocabulary, Kanji, pronunciation, and comprehension; learning practical language skills and intercultural communication through various topics. *Prq:* JAPN 202 or consent of department chair.

JAPN 306 Japanese Conversation and Composition 3(3,0) Continuation of JAPN 305. More practice in the spoken language with emphasis on vocabulary, Kanji, pronunciation, and comprehension. Learning practical language skills and intercultural communication through various topics. *Prq:* JAPN 305 or consent of department chair.

JAPN 307 Japanese Civilization I 3(3,0) Study of the significant aspects of the culture of Japan. *Prq:* JAPN 202 or consent of department chair.

JAPN 308 Japanese Civilization II 3(3,0) Study of significant aspects of the culture of Japan. *Prq:* JAPN 202 or consent of department chair.

JAPN 316 Japanese for International Trade I 3(3,0) Spoken and written Japanese common to the Japanese-speaking world of business and industry, with emphasis on business practices and writing and translating business letters and professional reports. Cross-cultural references provide opportunity for comparative and contrastive analysis of American and Japanese cultural patterns in a business setting. *Prq:* JAPN 306 or consent of department chair.

JAPN 398 Directed Reading 1-3(1-3,0) Directed study of selected topics in Japanese literature, language, and culture. May be repeated for a maximum of six credits. *Prq:* Consent of department chair.

JAPN 411 Studies in the Japanese Language I 3(3,0) Advanced training in the spoken and written language with emphasis on formal expressions. *Prq:* JAPN 306 or consent of department chair.

JAPN 412 Studies in the Japanese Language II 3(3,0) In-depth study of Kanji characters. *Prq:* JAPN 411 or consent of department chair.

JAPN 416 Japanese for International Trade II 3(3,0) Study of language and cultural environment of the Japanese-speaking market, including the linguistic and cultural idioms which support global marketing in general, and the international marketing of textiles, agricultural products, and tourism in particular. *Prq:* JAPN 316 or consent of department chair.

LANDSCAPE ARCHITECTURE

Professors: D. L. Collins, Chair; L. Tai; *Associate Professor:* F. F. Chamberlain; *Adjunct Professor:* G. Vander Mey; *Lecturer:* J. C. Blalock, Jr.

LARCH 262 Landscape Architectural Technology I 3(2,2) Lecture/studio course on the technological aspects of landscape architecture, including design grading and drainage, site information gathering and analysis, horizontal and vertical alignments of walks and roadways, structures of landscape architecture, irrigation design, pools and fountains, and lighting. *Prq:* DESIGN 251 and Sophomore standing or consent of program head.

LARCH 293 Field Studies Internship 1-3(0,3-9) Skill-based practical work experience to give the beginning student on-the-job learning opportunities. Requires a minimum of five weeks of uninterrupted, supervised, practical experience with preapproved commercial firm or public agency dealing with landscape architectural site issues. To be taken Pass/Fail only. *Prq:* DESIGN 252 and consent of instructor.

LARCH 351 Landscape Architecture Design I 6(1,10) Studio work with adjunct demonstrations and lectures concerned with intermediate landscape architectural design problems. *Prq:* DESIGN 252, 254.

LARCH 352 Landscape Architecture Design II 6(1,10) Continuation of LARCH 351. *Prq:* LARCH 351.

LARCH 362 Landscape Architectural Technology II 3(2,2) Continuation of LARCH 262. *Prq:* DESIGN 251 and sophomore standing and AGM 301 or consent of program head.

LARCH 421 Landscape Architectural Seminar 3(3,0) Lectures and seminars dealing with pertinent topics related to environmental, technological and theoretical issues in landscape architecture, land planning, and urban design. May be repeated for a maximum of six credits. *Prq:* Senior standing or consent of instructor.

LARCH 428 Landscape Architecture Computer-Aided Design 3(2,2) Lecture and lab class which focuses on computer-aided design and drafting. Students learn how to create landscape architecture illustrative plans and working drawings in black and white and color. *Prq:* Consent of instructor.

LARCH 451 Landscape Architecture Design III 6(1,10) Studio work with adjunct demonstrations and lectures concerned with advanced landscape architectural design problems. *Prq:* LARCH 352.

LARCH 452 Landscape Architecture Design IV 6(1,10) Continuation LARCH 451. *Prq:* LARCH 451.

LARCH 462 Landscape Architectural Technology III 3(2,2) Continuation of LARCH 362. *Prq:* LARCH 362.

LARCH 490 Directed Studies and Projects in Landscape Architecture 1-5(0,3-15) Comprehensive studies and/or research of special topics not covered in other landscape architectural courses. May be repeated for a maximum of ten credits. *Prq:* Consent of instructor.

LARCH 493 Professional Office Internship 1-3(0,3-9) Office experience for advanced students. On-the-job learning requires a minimum of five uninterrupted sequential weeks of employment under the direct supervision of a preapproved registered landscape architect, architect, urban planner, or civil engineer. To be taken Pass/Fail only. *Prq:* LARCH 352, 362, and consent of instructor.

LARCH 552 Professional Landscape Architectural Design 6(0,14) Complex problem-solving projects involving regional design analysis and planning, city planning and urban design, complex building relationships, and intense site utilization and design. May be repeated for a maximum of 12 credits.

LARCH 562 Landscape Architectural Technology IV 2(0,4) Studio course for the integration of design and technology. *Prq:* LARCH 462, professional standing. *Coreq:* LARCH 552.

LARCH 581 Landscape Architectural Professional Practice 3(3,0) Lecture course dealing with general consideration of landscape architectural office procedures. Study of the professional relationships of the landscape architects to client and contractor including problems of ethics, law, and business. *Prq:* Professional standing or consent of instructor.

LANGUAGE

LANG 191 Working/Internships Abroad Survey 1(1,0) Survey to familiarize students going abroad for work/internships with various international work environments. To be taken Pass/Fail only. *Prq:* Consent of instructor.

LANG (SPCH) 400, 600 Phonetics 3(3,0) Study of basic phonetic concepts used in the study of sounds in language.

LANG (ENGL) 454 Selected Topics in International Film 3(2,3) Presents subtitled films of specific world cultures and presents basic film theory and discourse applicable to the selected areas. Taught in English. May be repeated for a maximum of six credits with consent of department chair. *Prq:* Sophomore standing or consent of department chair.

LANGUAGE AND INTERNATIONAL TRADE

Professors: P. R. Heusinkveld, J. I. Suarez; *Associate Professors:* E. P. Arnold, J. C. Bednar, *Coordinator:* T. Kishimoto, D. Lepetit; *Assistant Professor:* C. L. Chavez

L&IT 127 Introduction to Language and International Trade 1(1,0) Survey of the nature of international trade and related career opportunities. Information and applications of specific relevance to tourism, agriculture, and textile industries are offered. To be taken Pass/Fail only.

L&IT 400 Language and International Trade Internship 1-3 One-semester, full-time (or equivalent part-time) work assignment which provides the opportunity for students to extend theoretical classroom learning through work experience in an appropriate setting. A final report is required. May be repeated for a total of six credits. To be taken Pass/Fail only. *Prq:* FR 316, GER 316, or SPAN 316 and 12 semester hours in a Language and International Trade technical option.

L&IT 401 Language and International Trade Practicum 1-3 Foreign language experience such as an approved study abroad program which provides the student with the opportunity to apply theoretical classroom learning to a foreign language experience in an appropriate setting. To be taken Pass/Fail only. *Prq:* FR 316 or GER 316 or SPAN 316 and six credits in language.

L&IT 402 Language and International Trade Directed Study 3 Directed study of an individual project in language and international trade. To be taken Pass/Fail only.

LATIN

Instructor: B. B. Lawson

LATIN 101 Elementary Latin 4(4,0) Course for beginners designed principally to teach the reading of the language.

LATIN 102 Elementary Latin 4(4,0) Continuation of LATIN 101.

LATIN 201 Intermediate Latin 3(3,0) Review of the fundamental principles of grammar in conjunction with readings from the Classical period. *Prq:* LATIN 102 or equivalent.

LATIN 202 Intermediate Latin 3(3,0) Continuation of LATIN 201 with the introduction of writings from the late Latin and Medieval periods. *Prq:* LATIN 201 or equivalent.

LEGAL STUDIES

Professors: A. H. Ringleb, T. B. Yandle; *Associate Professor:* F. L. Edwards; *Assistant Professor:* V. L. S. Ward-Vaughn; *Lecturers:* J. H. Curris, W. H. Durham, J. R. Jahn

LAW 312 Commercial Law 3(3,0) Introduction to business law with primary attention given to contracts, agency, and negotiable instruments. *Prq:* Junior standing.

LAW 313 Commercial Law 3(3,0) Continuation of LAW 312 with emphasis on business organizations, personal and real property, estates and bankruptcy, sales and secured transactions. *Prq:* LAW 312 or consent of instructor.

LAW 322, H322 Legal Environment of Business 3(3,0) Examination of both state and national regulation of business. Attention is given to the constitution and limitations of power, specific areas in which governments have acted, and the regulations that have been imposed in these areas. *Prq:* Junior standing.

LAW 333 Real Estate Law 3(3,0) The nature of real property and means of acquiring rights therein: conveyance of ownership, creation and execution of deeds, mortgages, etc., landlord and tenant relationships, shared concepts, and government regulation.

LAW 401 Labor Law 3(3,0) Basic labor law in the National Labor Relations Act, the Taft-Hartley and Landrum-Griffin Acts; legal problems raised by state and federal statutes such as Workmen's Compensation, Wage and Hour Legislation, and Equal Opportunity laws. *Prq:* LAW 322, Junior standing.

LAW 402 Law and Economics 3(3,0) Application of economics to the law of property, torts, and contracts; regulation of markets, business organizations, and financial transactions; and the distribution of income and wealth. *Prq:* ECON 211 and LAW 312 or consent of instructor.

LAW 405, 605 Construction Law 3(3,0) Provides a practical knowledge of legal principles applied to the construction process and legal problems likely to be encountered by the practicing construction professional. Topics include construction contracting, liability, claims and warranties, documentation, and responsibility and authority of contracting parties. *Prq:* LAW 312 or 322 or consent of instructor.

LAW 420 International Business Law 3(3,0) Intensive examination of the historical background of modern public and private international law; selected issues of public international law—human rights, law of war, United Nations's system, and international litigation; selected issues of private international law—international sales, international trade, and formation and operation of multinational businesses. *Prq:* LAW 312 or 322 or consent of instructor.

LAW 429, 629 Environmental Law and Policy 3(3,0) Review of legal issues involving environmental law and policy. Covers the law regarding water, land, and air pollution, and other special laws such as Superfund and RCRA. The consequences of existing and alternative rules for environmental protection are subject to economic analysis. *Prq:* LAW 312 or 322 or consent of instructor.

LAW 499, 699 Selected Topics 1-3(1-3,0) In-depth examination of timely topics in legal studies. May be repeated for a maximum of six credits, but only if different topics are covered. *Prq:* Senior standing and consent of instructor.

LEISURE SKILLS

Professor: J. R. Pope, Jr.; *Assistant Professor:* M. H. Wynn; *Lecturer:* B. W. Stevens

L S 101 Challenge Recreation Activities 1(1,0) Encourages students to broaden their leisure skills and improve their self-images through challenge activities. Classroom instruction stresses how to get started safely in flying, scuba, canoeing, skiing, windsurfing, mountaineering, hang-gliding, ballooning, and other challenge activities.

L S 110 Bowling 1(0,3) Basic instructional program on techniques of bowling.

L S 120 Selected Topics 1(0,3) Provides an opportunity for presentation of leisure skills not covered in other courses. May be repeated for a maximum of three credits, but only if different topics are covered.

L S 130 Alpine Skiing 1(0,3) Basic downhill snow skiing instruction including equipment selection, safety, and maintenance; parallel turns; edging; carved and linked turns; wedeling; and safety and etiquette. There is an additional fee for this course.

Taught during Christmas recess. (Contact the Department of Parks, Recreation, and Tourism Management in October.)

L S 150 Beginning Swimming 1(0,3) Fundamentals of swimming and water safety.

L S 152 Sailing 1(0,3) Basic instruction in the nomenclature, safety and rescue techniques, and skills required to skipper sailing craft. *Prq:* Basic swimming skills.

L S 153 Beginning Canoeing 1(0,3) Basic instruction in the nomenclature, strokes, and safety techniques in canoeing. *Prq:* Basic swimming skills.

L S 154 Windsurfing 1(0,3) Basic windsurfing instruction including rigging, launching, tacking, jibbing, rig and foot steering, safety, maintenance, equipment selection, rules-of-the-road, and racing techniques are covered. Offered Fall Break and First Summer Session. There is an extra fee for this course. *Prq:* Ability to swim 300 yards and tread water for five minutes.

L S 155 Whitewater Kayaking 1(0,3) Flat-water and whitewater skills, techniques, safety, rescue, equipment selection and maintenance, and selection of routes/trips to participate in basic whitewater kayaking. *Prq:* Basic swimming skills.

L S 160 Beginning Tennis 1(0,3) Fundamentals course stressing rules, strokes, and strategy, with ample opportunity for practice.

L S 163 Racquetball 1(0,3) Basic skills, knowledge of rules, and strategy, and basic strokes.

L S 170 Beginning Golf 1(0,3) Fundamental course stressing rules, strategy, and basic strokes.

L S 181 Rock Climbing 1(0,3) Basic rock climbing skills, including philosophy, safety, knots, climbing techniques, site and supplies selection, and nature/conservation issues.

L S 182 Camping and Backpacking 2(1,2) Basic camping and backpacking skills including map and compass reading, outdoor cooking, camping hazards and safety, site selections, and trip planning.

L S 190 Modern Dance 1(0,3) Introduction to modern dance techniques with emphasis on developing the style of movement and understanding the dance art form.

L S 191 Aerobic Dance 1(0,3) Instruction in the development of skills for the safe improvement and maintenance of cardiovascular fitness, flexibility, and muscle tone utilizing dance movements and techniques.

L S 192 Learn to Dance 1(0,2) Students develop an understanding of the qualities of dance, recognize the importance of dance as a leisure pursuit, and learn to dance to difference types of music. Dances include shag, waltz, cha-cha, foxtrot, as well as current dance trends.

L S 201 Sports Officiating 1(0,3) Practical study of officiating for various sports. Includes studies and practical application of officiating rules and mechanics. Sports to be studied include football, basketball, softball, soccer, and introductions to a variety of other team sports.

L S 230 Advanced Alpine Skiing 1(0,3) Advanced downhill snow skiing instruction in such techniques as mogul skiing, check turns, free-style, and racing. There is an additional fee for course. Taught during Christmas recess. (Contact Department of Parks,

Recreation, and Tourism Management in October.) *Prq:* L S 130 or consent of instructor.

L S 254 Advanced Lifesaving 1(0,3) Enhances aquatic skills and develops lifesaving techniques. Teaches progressive techniques and practice of lifesaving and water safety skills. *Prq:* Pass preliminary swim test.

L S 255 Water Safety Instruction 1(1,0) Teaches progressive techniques and practice of teaching swimming and lifesaving. *Prq:* L S 254.

L S 260 Intermediate-Advanced Tennis 1(0,3) Opportunity to advance and correct mistakes in basic tennis skills. *Prq:* Basic tennis skills.

L S 263 Intermediate Racquetball 1(0,3) Stresses advanced skills, techniques, and strategy with ample opportunity for practice and competition. Conditioning drills and safety aspects are also covered. *Prq:* L S 163 or consent of instructor.

L S 292 Intermediate Ballroom Dance 1(0,2) Students develop an understanding of advanced dance methods, learn about dance at social and competitive levels, and increase knowledge of a variety of both smooth and Latin steps at the intermediate level. Dances include tango, cha-cha, waltz, foxtrot and swing. *Prq:* L S 192 or permission by instructor.

L S 293 Intermediate Shag 1(0,2) Gives students an understanding of the South Carolina state dance, its history, and impact on the state. Students learn more advanced steps in shag, including bellyroll, sugarfoot, slide step, tiptoe up the ladder, the pivot, and the thirteen steps. *Prq:* L S 192 or permission of instructor.

MANAGEMENT

Professors: J. K. Butler, Jr., R. S. Cantrell, M. D. Crino, J. S. Davis, D. W. Grigsby, *Chair:* W. H. Hendrix, J. J. Kanet, R. L. LaForte, J. L. Leap, M. A. McKnew, P. L. Roth, V. Sridharan; *Associate Professors:* N. Balakrishnan, R. L. Clarke, L. D. Fredendall, J. Miller, J. W. Patterson, T. L. Robbins, C. H. St. John, T. P. Summers; *Assistant Professors:* M. J. Paringer, R. W. Pouder, W. H. Stewart, Jr.; *Lecturers:* L. A. Hudson, Jr., T. B. Huneycutt, J. I. McKnew, G. L. Newkirk

MGT 100 Management Orientation 1(1,0) Introduces Management Department and Management degree programs to new students. Provides an overview of program content and the skills and capabilities expected of students as they progress through the program.

MGT 218, H218 Management Applications of Microcomputers 3(3,0) Three aspects of microcomputer applications are addressed: (1) analysis of the business potential of microcomputer applications, (2) use of microcomputers to reinforce material from other management courses, and (3) the microcomputer as a professional support device. *Prq:* CP SC 120 or consent of instructor.

MGT 299 Computer Utilization 1(1,0) Familiarization with the use of mainframe computers for statistical analysis and access to Internet facilities. *Prq:* CP SC 120 and MTHSC 301.

MGT 301, H301 Principles of Management 3(3,0) Management's role as a factor of economic production. Functions of management, principles of organization, and behavior in organizations.

MGT 305 Economics of Transportation 3(3,0) Formerly MGT 405. Topics include history and structure of transportation systems in the United States, the nature of transportation costs and rates, transportation systems as factors in industrial location, transportation policy, and transportation's role in national security. *Prq:* Junior or Senior standing.

MGT (ECON) 306 Managerial Economics 3(3,0) See ECON 306.

MGT 307, H307 Personnel Management 3(3,0) Principles, concepts, and techniques concerned with effective and efficient utilization of personnel. Emphasis is on motivation, leadership, and human behavior as related to employer-employee relations. Topics include personnel recruitment, classification, selection, training, development, and performance evaluation. *Prq:* Junior standing.

MGT 315 New Venture Creation 3(3,0) Introduction to entrepreneurship as an alternative career strategy. Examines the transformation of original business ideas into viable enterprises through the use of competitive wedges. Specifically treats the legal and regulatory requirements for business formation.

MGT 317 Logistics Management 3(3,0) Formerly MGT 417. Management of physical distribution and supply systems with emphasis on design concepts, cost determinants, and control. *Prq:* Junior or Senior standing.

MGT 390 Operations Management 3(3,0) Examines the role of operations management in both manufacturing and service organizations. Discusses the concepts, tools, and techniques for managing the operations function. Topics include operations strategy, design, planning, and control. *Prq:* MTHSC 301 or equivalent.

MGT 400 Management of Organizational Behavior 3(3,0) Provides management students with a framework for understanding how behavior within business organizations is managed. Particular emphasis is on integrating management theory with recent developments in the behavioral sciences with distinct management applications. Theory, research, and business applications are considered. *Prq:* MGT 301 or 307.

MGT 402, H402 Operations Planning and Control 3(3,0) Managing, planning, and controlling production and service operations with emphasis on demand forecasting, aggregate planning, production scheduling, and inventory management. *Prq:* MA SC 310 and 312, MGT 390.

MGT 403 Special Problems 1-3(1-3,0) Planning, developing, and executing a research project related to the field of management and defense studies. May be repeated for a maximum of six credits. *Prq:* Senior standing in Industrial Management or Management and consent of instructor.

MGT 404 Advanced Statistical Quality Control 3(3,0) Statistical quality control techniques as applied to all areas of quality control: process control, process capability, acceptance sampling, and economic aspects of quality decisions. *Prq:* MA SC 310 and MGT 390.

MGT 408 Design of Production Systems 3(3,0) Examines the design of systems for production and delivery of goods and services. Emphasizes the impact of alternative designs on the competitive posture of the firm. Discusses the concepts, tools,

and techniques for designing facilities and jobs and systems for continuous performance improvement. *Prq:* MA SC 310, 312 and MGT 390.

MGT 411 Project Management 3(3,0) Examination and application of the project management body of knowledge. This consists of theory, tools, and techniques to organize, plan, and control individuals, teams, quality, and operations while conducting a project. *Prq:* EX ST 301 or MTHSC 301 or equivalent.

MGT 415, H415 Business Strategy 3(3,0) Capstone course for seniors. Various methods are used in analyzing complex business problems, requiring students to integrate their knowledge of all areas of business. Student participation and written and oral communications are stressed. *Prq:* Senior standing or consent of instructor.

MGT 416, 616 Management of Human Resources 3(3,0) Recent developments in the management of human resources with emphasis on results of research into the motivation, development of potential, and full utilization of the human resources. *Prq:* MGT 307 and 400 or consent of instructor.

MGT 418, 618 Management Information Systems 3(3,0) Use of data processing concepts as an aid in implementing managerial functions. Electronic data processing terminology, software, hardware, computer operations and techniques, systems analysis, and the principles of management information systems design and implementation are emphasized. *Prq:* MGT 218 or consent of instructor.

MGT 422 Small Business Management 3(3,0) Study of the management of the small independently owned and operated business. Emphasis is on analyzing new business opportunities, planning and establishing a growing concern, and managing the contemporary small business. Field experience in consulting with small businesses enhances students' understanding of the unique opportunities and problems of small business organizations. *Prq:* MKT 301 or consent of instructor.

MGT 423, 623 International Business Management 3(3,0) Survey of the theoretical and institutional complexities of international business operations. Topics include exporting, importing, foreign investment, multinational corporations, and the international payment system. *Prq:* Junior or Senior standing.

MGT 424, 624 International Transportation and Logistics 3(3,0) Examination and analysis of international transportation systems and their logistics support systems. Topics include ocean shipping, international air transportation, port management, and EEC and Soviet-block transport systems. International transport legislation and policies are also analyzed. *Prq:* Senior standing or consent of instructor.

MGT 425, 625 Compensation Management 3(3,0) Examination of the compensation employees seek in exchange for their efforts and contributions. Topics include government and union influences; job content analysis, description, and evaluation; developing pay structures; measuring and paying for performance; employee benefits; administration of the compensation plan; executive, managerial, professional, and sales. *Prq:* MGT 307 or consent of instructor.

MGT 426 Industrial Traffic Management 3(3,0) Surveys the responsibilities and functions of industrial traffic management in manufacturing and distribution. Emphasis is on the role of the industrial traffic manager in optimizing the logistics system of the firm (i.e., the materials management of its inbound supplies and the distribution of its finished products). *Prq:* MGT 305 or 317.

MGT 427 Managing Continuous Improvement 3(3,0) Examination of issues related to continuous improvement, including a systematic approach to selecting improvement areas, determining how to improve, plan, and manage the improvement process. Topics include selecting performance measurements, using teams to achieve breakthrough change, identifying root causes of problems, and developing and implementing solutions to problems. *Prq:* MGT 390 or permission of instructor.

MGT 430 Senior Seminar in Management 3(3,0) In-depth study of current business topics; allows senior management students the opportunity to relate their academic studies to real-world problems. A senior paper is required. *Prq:* Senior standing.

MGT 431 Employee Diversity, Rights, and Responsibilities 3(3,0) Focuses on employee and organizational rights and responsibilities. Topics include various types of discrimination (race, sex, religious, national origin, age, and disability status); drug and alcohol testing; AIDS in the workplace; employee discipline and termination issues; privacy and safety concerns; and union organizing campaigns.

MGT 435 Personnel Interviewing 3(3,0) Helps students understand current interviewing theory, conduct an employment interview, and advise their future employers how to improve interviewing programs. Topics include job analysis, legal issues, types of interviews, and evaluating applicants. *Prq:* Permission of instructor.

MGT 444 International Perspectives in Industrial Management 3-6(3-6,0) Provides an international perspective to industrial management via organized plant visitations to businesses in a foreign country and lectures by, and discussions with, senior operations manager(s). Cultural visits and lectures are also organized to provide a holistic perspective to cover cultural and economic environment of the host country. Students are responsible for travel costs. May be taken for a maximum of six credits. *Prq:* Permission of instructor.

MGT 490 Selected Topics in Industrial Management 3(3,0) In-depth examination of advanced topics in Industrial Management. Topics may vary in keeping with developments in the management profession and interests of faculty. Emphasis is on the application of these topics to the production and operations management environment. *Prq:* MGT 402 or 404 or 408.

MANAGEMENT SCIENCE

Professors: R. S. Cantrell, M. A. McKnew; *Associate Professor:* J. W. Patterson; *Assistant Professors:* N. Balakrishnan, J. L. Miller; *Lecturer:* J. I. McKnew

MA SC 310, H310 Introduction to Management Science 3(3,0) Quantitative methods of the management scientist with applications to business and industrial problems. Topics include regression analy-

sis, correlation analysis, analysis of variance, sampling, and nonparametric methods. *Prq:* EX ST 301 or MTHSC 301.

MA SC 312, H312 Decision Models for Management 3(3,0) Exploration of the ways in which management science decision models can help in making sound managerial decisions. Topics include decision models and decision making, deterministic modeling, probabilistic modeling, and simulation. May not be taken by students who have passed MA SC 413. *Prq:* MTHSC 301 or equivalent.

MA SC 413 Management Science 1(3,0) Role and use of management science techniques in decision making in business and industry. Stochastic and deterministic models are emphasized. Topics include linear programming, queueing, Markov chains, and simulation. May not be taken by students who have passed MA SC 312. *Prq:* Consent of instructor.

MA SC 414 Statistical Analysis 3(3,0) Application of statistics in management decision making. Emphasis is on the proper design, analysis, and interpretation of planned experiments. Topics include single factor through fractional factorial experiments. *Prq:* MA SC 310 or equivalent.

MARKETING

Professors: L. Carlson, R. M. Reese, *Chair; Associate Professors:* M. J. Dorsch, C. R. Duke, R. Gomes, S. J. Grove, P. A. Knowles, M. C. LaForge, G. M. Pickett; *Assistant Professors:* J. D. Mittelstaedt, J. N. Moore

MKT 301, H301 Principles of Marketing 3(3,0) Principles and concepts involved in planning, pricing, promoting, and distributing of goods and services. *Prq:* Minimum of 45 hours completed or consent of instructor.

MKT 302 Consumer Behavior 3(3,0) Examination of selected individual and group behavioral science concepts and their application to the understanding of consumer decision making. *Prq:* MKT 301.

MKT 321 Sports Marketing 3(3,0) Exploration of the essentials of effective sports marketing. Topics include application of marketing principles in the sports area, licensing issues, sponsorships and endorsements, stadium and arena marketing, broadcasting and media considerations, public policy and sports, and unique marketing challenges for sport specific products (football, basketball, baseball, motorsports, etc.). *Prq:* MKT 301 or consent of instructor.

MKT 399 Marketing Internship 3(0,9) Preplanned, preapproved, faculty-supervised marketing internships. Credit will only be given for internships of at least ten, full-time, consecutive weeks with the same internship provider. Restricted to students with a major or minor in marketing. To be taken Pass/Fail only. *Prq:* MKT 301 and consent of instructor.

MKT 420 Professional Selling 3(3,0) Current theories about the selling of goods and services to organizational buyers in the context of long-term relationships. Role playing, video-taped presentations, and other techniques are generally employed to enhance interpersonal communication skills. *Prq:* Junior standing.

MKT 422 Entrepreneurship 3(3,0) Translation of the theories of marketing into practical ideas and techniques that promote successful marketing practices in small business. *Prq:* MKT 301 or consent of instructor.

MKT 423, 623 Promotional Strategy 3(3,0) Emphasis on promotion as the communication function of marketing. Attention given to communication theory and promotion's relation to mass and interpersonal communication. Factors affecting the promotional decision-making process are explored, and promotion as a competitive tool is examined. *Prq:* MKT 301 or consent of instructor.

MKT 424 Sales Management 3(3,0) Comprehensive examination of the planning, implementation, and control of professional sales organizations. *Prq:* MKT 301 or consent of instructor.

MKT 425 Retail Management 3(3,0) Retailing is studied from a decision-making approach. Topics include target, market analysis, location analysis, merchandising, human resources, pricing and promotion. *Prq:* MKT 301 or consent of instructor.

MKT 426 Business-to-Business Marketing 3(3,0) Study and analysis of the unique aspects of marketing goods and services to organizational buyers rather than household consumers. Emphasis is on developing strategic responses to market opportunities given competitive behavior. *Prq:* MKT 301 or consent of instructor.

MKT 427, 627 International Marketing 3(3,0) Study of marketing from the international point of view. Emphasis is on the necessary modification of marketing thinking and practice for foreign markets due to individual environmental differences. *Prq:* MKT 301.

MKT 428, 628 Services Marketing 3(3,0) Exploration and study of the nature of service organizations and the principles which guide the marketing of their products. Emphasis is on a marketing mix that is fundamentally different than that found in traditional goods marketing. *Prq:* MKT 301 or consent of instructor.

MKT 429, 629 Public and Nonprofit Marketing 3(3,0) Examines the role and application of marketing in public and nonprofit settings. Focuses on a conceptual understanding of the marketing discipline and marketing processes and shows how basic concepts and principles of marketing are applicable to public and nonprofit organizations. *Prq:* MKT 301 or consent of instructor.

MKT 430, 630 Marketing Product Management 3(3,0) Management of the firm's product or service offerings. Topics include new product screening, evaluation, and development; product line and mix analysis, abandonment decisions, brand manager's role, new product development department, and others. Emphasis is on decision making. *Prq:* MKT 301 and MA SC 310; or consent of instructor.

MKT 431, 631 Marketing Research 3(3,0) Research used in marketing decision making. Primary emphasis is on methods and techniques used in planning, collection, processing, and utilization of information. Topics include research design, sources of information, questionnaire design, sampling, data collection and data analysis. *Prq:* MKT 301, MTHSC 301, and MA SC 310; or consent of instructor.

MKT 433 Sport Marketing Strategy 3(3,0) Provides students with basic knowledge about brand management as it applies to sport. Addresses basic principles and guiding precepts of how sport-based organizations build strong brands. *Prq:* MKT 321 or consent of instructor.

MKT 434 Sport Promotion 3(3,0) Emphasizes the promotional function of sport. Topics include event sponsorship, developing media relationships, endorsements, promotion objective setting and budgeting, media planning and scheduling, and utilizing the tools of promotion within a sport context. Integrated Marketing Communication provides the theoretical and managerial framework for how these factors are utilized optimally. *Prq:* MKT 321 and 423.

MKT 435 International Sport Marketing 3(3,0) Provides working knowledge of international sport marketing. Consists of lecture and site visits. Topics include brief history of sport, sport marketing basics, building sport brands, sport strategies, and issues facing the new sporting goods industry. *Prq:* MKT 301.

MKT 450 Strategic Marketing Management 3(3,0) Application of marketing constructs in the analysis and solution of marketing problems. Emphasis is placed on information systems, data analysis, and critical-thinking skills in solving marketing problems in a wide range of managerial decision areas including, but not limited to, new product development, pricing, advertising, personal selling, channels, and international marketing. *Prq:* MKT 301 and 6 hours of 400-level marketing courses.

MKT 495, 695 Selected Topics 3(3,0) In-depth examination of timely topics in marketing. May be repeated for credit as topics vary. *Prq:* MKT 301 or consent of instructor.

MKT 499 Independent Study 1-3(1-3,0) Directed readings or independent research in selected marketing areas. Topics must be selected and proposed by student. Proposals must be approved by instructor. May be repeated for a maximum of three credits. *Prq:* MKT 301, 302 and consent of instructor.

MATHEMATICAL SCIENCES

Professors: W. P. Adams, J. R. Brannan, J. V. Brawley, Jr., F. M. Cholewinski, P. M. Dearing, R. E. Fennell, W. R. Hare, Jr., P. T. Holmes, R. E. Jamison, J. P. Jarvis, Chair; C. D. Jeffries, J. D. Key, M. M. Kostreva, R. C. Laskar, R. F. Ling, J. K. Luedeman, W. F. Moss III, P. R. Nelson, T. G. Proctor, J. A. Reneke, D. R. Shier, D. D. Warner, *Associate Professors:* C. L. Cox, V. J. Ervin, P. C. Kiessler, K. B. Kulasekera, J. K. Peterson, C. B. Russell, M. J. Saltzman, H. F. Senter, F. E. Sullivan, M. M. Wiecek, C. L. Williams, *Assistant Professors:* N. J. Calkin, M. A. Coffin, H. D. DeSimone, J. Duan, I. B. Fetta, C. M. Gallagher, S. Gao, J. G. LaTorre, H. K. Lee, B. A. Novick, *Lecturers:* S. S. Biggers, P. E. Garner, S. A. Prevost; *Visiting Associate Professors:* K. M. Fleming, J. C. Harden; *Visiting Assistant Professors:* J. W. Lawson, Jr., J. H. Nicholson; *Visiting Instructors:* D. Briggs, J. M. Flatt, L. M. Hanna, C. S. Pate, D. M. Simms, S. E. Stasiukaitus, A. K. Stoddard

MTHSC 101 Introduction to Probability 3(3,0) Introductory study of randomness and probability. Major topics include descriptive techniques for data, basic probability concepts, permutations and combinations, discrete distributions, normal and uniform distributions, sampling distributions and the central limit theorem. *Prq:* Satisfactory score on the Mathematics Test, Level II (Standard) or consent of instructor.

MTHSC 102 Introduction to Mathematical Analysis 3(3,0) Intuitive approach to the concepts and applications of calculus. Topics include functions and graphing, differentiation, and integration. Applications from social, biological, and management sciences are presented. Not open to those receiving credit for MTHSC 106. *Prq:* Satisfactory score on the Mathematics Test, Level II (Standard) or consent of instructor.

MTHSC 104 College Algebra 3(3,1) Basic course in college algebra designed to prepare students for more advanced courses in finite probability, mathematical analysis, and elementary statistics. Fundamental concepts of algebra, algebraic equations and inequalities, functions, and graphs will be studied. Students who have received credit for MTHSC 102 or 105 or 106 will not be allowed to enroll in or receive credit for MTHSC 104.

MTHSC 105 Precalculus 5(5,1) Extensive treatment of topics chosen to prepare students for the study of calculus. Special emphasis is given to polynomial, rational, exponential, logarithmic, and trigonometric functions and their graphs, as well as basic and analytic trigonometry. Students who have received credit for MTHSC 102 or 104 or 106 will not be allowed to enroll in or receive credit for MTHSC 105.

MTHSC 106, H106 Calculus of One Variable I 4(4,0) Topics include analytic geometry, introduction to derivatives, computation and application of derivatives, integrals, exponential and logarithm functions. *Prq:* MTHSC 105, or a satisfactory score on the Mathematics Test, Level II (Standard) or consent of instructor.

MTHSC 108, H108 Calculus of One Variable II 4(4,0) Topics include infinite series, limits, differentiation and techniques of integration. *Prq:* MTHSC 106.

MTHSC 115 Contemporary Mathematics for Elementary School Teachers I 3(3,0) Cooperative learning groups, manipulatives, and concrete models are used to demonstrate logical reasoning, problem-solving strategies, sets and their operations, numeration systems, properties and operations of whole numbers, number theory, prime and composite numbers, divisibility, common factors and multiples. Open to Elementary, Early Childhood, and Special Education majors only. *Prq:* Satisfactory score on the SAT II Mathematics Level IIc Test, or MTHSC 104.

MTHSC 116 Contemporary Mathematics for Elementary School Teachers II 3(3,0) Continuation of MTHSC 115. Manipulatives and concrete models are used for properties, operations, and problem solving for integers, elementary fractions, rational numbers, and real numbers. Selected topics in statistics and probability are introduced with a hands-on approach to learning. Open to Elementary, Early Childhood, or Special Education majors only. *Prq:* MTHSC 115 or consent of instructor.

MTHSC 119 Introduction to Discrete Methods 3(3,0) Topics normally include elementary logic and methods of proof; sets, functions, and relations; graphs and trees; combinatorial circuits and Boolean Algebra. *Prq:* Satisfactory score on the Mathematics Test, Level II (Standard).

MTHSC 129 Problem Solving in Discrete Mathematics 3(2,2) Problem-solving approach to learning mathematics is applied to topics in modern discrete mathematics. Typical selection of topics includes logic and proof, sets, relations, functions, mathematical induction, graphs and trees, counting techniques, recurrence equations. For Bachelor of Science and Bachelor of Arts majors in Mathematical Sciences only. Credit may not be received for both MTHSC 119 and 129. *Prq:* MTHSC 106.

MTHSC 203 Elementary Statistical Inference 3(3,0) Survey course in fundamental statistical principles with applications. Topics include estimation, tests of hypotheses, simple linear regression and correlation, analysis of count data, and nonparametric statistics. May not be taken for credit by students who have passed MTHSC 301, 302, or EX ST 301. *Prq:* MTHSC 101.

MTHSC 206, H206 Calculus of Several Variables 4(4,0) Topics include real valued functions of several variables, multiple integration, differential calculus of functions of several variables, vector field theory. *Prq:* MTHSC 108.

MTHSC 207 Multivariable Calculus 3(3,0) Introduction to the calculus of several variables, differential calculus and optimization of several variables, multiple integrals. Topics from the management sciences are used to illustrate the above concepts. May not be taken by students who have passed MTHSC 206. *Prq:* MTHSC 102, or 106 with consent of instructor.

MTHSC 208, H208 Introduction to Ordinary Differential Equations 4(4,0) Introduction to the study of differential equations and their application to physical problems. Topics include exact, series, and numerical solutions; solutions by means of Laplace transforms; and solutions of systems of differential equations. *Prq:* MTHSC 206.

MTHSC 210 Applied Matrix Algebra 3(3,0) Introduction to the basic principles of matrix algebra with applications to the behavioral and managerial sciences. Major areas of application include linear programming, directed graphs, and game theory. *Prq:* MTHSC 101 and 102 or 106.

MTHSC 216 Geometry for Elementary School Teachers 3(3,0) Informal treatment of the basic concepts of geometry. Open to Elementary, Early Childhood, or Special Education majors only. *Prq:* MTHSC 116 or consent of instructor.

MTHSC 231 Mathematics of Life Insurance 3(3,0) Introduction to basic mathematics of finance and life insurance. Topics include compound interest, annuities certain, mortality tables, life annuities, net premiums, net level reserves, modified reserves, nonforfeiture values and dividends.

MTHSC 232 Actuarial Science Seminar I 1(1,0) Problem-solving seminar designed to prepare the student for the Society of Actuaries Examination I (General Mathematics). *Prq:* MTHSC 206.

MTHSC 250 Introduction to Mathematical Sciences 1(1,0) Lectures and discussions on the

mathematical sciences disciplines: Applied Mathematics, Computing Science, Core Mathematics, Management Science, Operations Research, and Statistics. *Prq:* MTHSC 106.

MTHSC 301, H301 Statistical Theory and Methods I 3(3,0) Principal topics include elementary probability theory, discrete and continuous random variables, expected values, normal distribution, chi-square distribution, t-distribution, F-distribution, tests of hypotheses, point and interval estimation, curve fitting. *Prq:* MTHSC 106 or 207 or 210.

MTHSC 302 Statistics for Science and Engineering 3(3,0) [W.1] Methodology for collecting, organizing, and interpreting data. Topics include understanding variability, graphical and numerical summarization of data, introductory probability, normal and related distributions, statistical inference, experimental design, simple linear regression. Statistical microcomputer software is used. *Prq:* MTHSC 206.

MTHSC 308 College Geometry 3(3,0) Theorems and concepts more advanced than those of high school geometry. Treatment of the various properties of the triangle, including the notable points, lines, and circles associated with it. *Prq:* MTHSC 106.

MTHSC 311, H311 Linear Algebra 3(3,0) Introduction to the algebra of matrices, vector spaces, polynomials, and linear transformations. *Prq:* MTHSC 108 or consent of instructor.

MTHSC 360 Intermediate Mathematical Computing 3(3,0) Continuing study of mathematical computing using the FORTRAN language. Emphasis on subroutine computation with applications to problems in science and engineering. *Prq:* CP SC 110 or consent of instructor.

MTHSC 400, H400, 600 Theory of Probability 3(3,0) Principal topics include combinatorial theory, probability axioms, random variables, expected values; special discrete and continuous distributions, jointly distributed random variables, correlation, conditional expectation, law of large numbers, central limit theorem. *Prq:* MTHSC 206 or consent of instructor.

MTHSC 403, H403, 603 Introduction to Statistical Theory 3(3,0) Principal topics include sampling distributions, point and interval estimation, maximum likelihood estimators, method of moments, least squares estimators, tests of hypotheses, likelihood ratio methods, regression and correlation analysis, introduction to analysis of variance. *Prq:* MTHSC 400 or equivalent.

MTHSC 405, 605 Statistical Theory and Methods II 3(3,0) Principal topics include simple linear regression, multiple regression and correlation analysis, one-way analysis of variance, multiple comparison, multifactor analysis of variance, experimental design. Computation and interpretation of results are facilitated through use of statistical computer packages. *Prq:* MTHSC 301.

MTHSC 406, 606 Sampling Theory and Methods 3(3,0) Probability-based treatment of sampling methodology. Theory and application of estimation techniques are treated using simple and stratified random sampling, cluster sampling, and systematic sampling. *Prq:* MTHSC 302 and 400, or consent of instructor.

MTHSC 407, 607 Regression and Time-Series Analysis 3(3,0) Theory and application of the regression and time series. Approaches to empirical model building and data analysis are treated. Computation and interpretation of results are facilitated through the use of interactive statistical packages. *Preq:* MTHSC 302, 311, and 400; or consent of instructor.

MTHSC 408, 608 Topics in Geometry 3(3,0) Introduction to topics in special geometries which include non-Euclidean space concepts such as projective geometry, finite geometries, and intuitive elementary topology. Brief introduction to vector geometry. *Preq:* MTHSC 206.

MTHSC 410 Number Theory 3(3,0) Introduction to the theory of integers and related number systems. Topics include historical development, principle of mathematical induction, divisibility, primes, congruences, number-theoretic functions, primitive roots, quadratic residues, and diophantine equations. *Preq:* MTHSC 108 or consent of instructor.

MTHSC 412, H412, 612 Introduction to Modern Algebra 3(3,0) Introduction to the concepts of algebra. Topics include the number system and the elementary theory of groups, rings, and fields. *Preq:* MTHSC 311.

MTHSC 419, H419, 619 Discrete Mathematical Structures I 3(3,0) Applies theoretical concepts of sets, functions, binary relations, graphs, Boolean algebras, propositional logic, semigroups, groups, homomorphisms, and permutation groups to computer characteristics and design, words over a finite alphabet and concatenation, binary group codes, and other communication or computer problems. *Preq:* MTHSC 311.

MTHSC 432 Actuarial Science Seminar II 1(1,0) Problem-solving seminar to prepare students for the Society of Actuaries Examination 2 (probability and statistics). *Preq:* MTHSC 403 may be taken concurrently or consent of instructor.

MTHSC 434, 634 Advanced Engineering Mathematics 3(3,0) Fourier series, Laplace and Fourier transform and numerical methods for solving initial value and boundary-value problems in partial differential equations are developed. Applications to diffusion wave and Dirichlet problems are given. Matrix methods and special functions are utilized. *Preq:* MTHSC 208.

MTHSC 435, H435, 635 Complex Variables 3(3,0) Elementary functions; differentiation and integration of analytic functions; Taylor and Laurent series; contour integration and residue theory; conformal mapping; Schwartz-Christoffel transformation. *Preq:* MTHSC 206.

MTHSC 440, H440, 640 Linear Programming 3(3,0) Introduction to linear programming covering the simplex algorithm, duality, sensitivity analysis, network models, formulation of models, and the use of simplex codes to solve, interpret, and analyze problems. *Preq:* MTHSC 206, 311, or consent of instructor.

MTHSC 441, H441, 641 Introduction to Stochastic Models 3(3,0) Introductory treatment of stochastic processes, finite-state Markov chains, queueing, dynamic programming, Markov decision processes, reliability, decision analysis, and simulation. Both theory and applications are stressed. *Preq:* MTHSC 400.

MTHSC 450 Introduction to Mathematical Models 3(3,0) Study of the modeling process which includes translation of practical problems into mathematical models, solution of the mathematical models, and interpretation of the solution back into practical problems. Examples are chosen from the physical, biological, social, and management sciences. *Preq:* CP SC 110, MTHSC 208.

MTHSC 453, H453, 653 Advanced Calculus I 3(3,0) Limits, continuity, and differentiation of functions of one and several variables, the Riemann integral, and vector analysis. *Preq:* MTHSC 206.

MTHSC 454, H454, 654 Advanced Calculus II 3(3,0) Continuation of MTHSC 453. Transformations, multiple integrals, line and surface integrals, infinite sequences and series, and improper integrals. *Preq:* MTHSC 453.

MTHSC 460, 660 Introduction to Numerical Analysis I 3(3,0) Introduction to the problems of numerical analysis emphasizing computational procedures and application. Topics include sources of error and conditioning, matrix methods, systems of linear equations, nonlinear equations, interpolation and approximation by splines, polynomials, and trigonometric functions. *Preq:* MTHSC 206 or 207 and 360 or equivalent.

MTHSC 463, H463, 663 Mathematical Analysis I 3(3,0) Basic properties of the real number system, sequences and limits, continuous functions, uniform continuity and convergence. Integration, differentiation, functions of several real variables, implicit function theory. *Preq:* MTHSC 206.

MTHSC 481 Seminar in Mathematics 1-3(1-3,0) Attention is focused on mathematical areas in which nonroutine problems can be posed with comparative ease. Emphasis is on independent study and student use of previously acquired mathematical skills. Open to students only by invitation for not more than three hours credit.

¹Credit toward graduation will be given for only one of the following: EX ST 301, MTHSC 301, 302.

MECHANICAL ENGINEERING

Professors: D. E. Beasley, S. B. Biggers, M. W. Dixon, R. S. Figliola, Chair; J. L. Gaddis, M. Grujicic, I. Haque, C. O. Huey, Jr., E. H. Law, F. W. Paul, C. E. G. Preimrebel, T. Wang, D. A. Zumbunnen; *Associate Professors:* G. M. Fadel, P. F. Joseph, J. M. Kennedy, J. H. Leylek, C. D. Rahn; *Assistant Professors:* S. Ahzi, J. C. Bokar, B. Han, E. Marotta, J. M. Ochterbeek, L. L. Thompson, J. R. Wagner; *Lecturers:* L. P. Golan, J. B. Riestler, C. K. Roby; *Adjunct Professor:* P. M. Taylor

M E 202 Foundations of Mechanical Systems 3(3,0) Introduces students to the basic physical elements of mechanical engineering systems. Problem-solving, design, and resourceful application of mathematics and general principles from the students' science courses are emphasized throughout. *Preq:* MTHSC 108, PHYS 122, E M 201 (or concurrent enrollment).

M E 203 Foundations of Thermal and Fluid Systems 2(3,0) Introduction to control volumes, conservation laws of mass, momentum, and energy. Concepts of work and heat are introduced, including rate forms. Properties of pure substances. *Preq:* MTHSC 206, PHYS 221.

M E 205 Computer Analysis in Engineering 2(2,0) [C.1] Application of undergraduate mathematics and basic engineering principles with an emphasis on numerical methods and the use of mathematical software packages in the solution of engineering problems. Problems are drawn from dynamics, vibrations, kinematics, thermodynamics, heat transfer, materials engineering, fluid mechanics, and other engineering fields. *Preq:* ENGR 120, MTHSC 208 (or concurrent enrollment), PHYS 122 and Mechanical Engineering major.

M E 221 Mechanical Engineering Laboratory I 1(0,3) Discovery of mechanical engineering principles and phenomena. Introduction to laboratory safety practices, instrumentation, calibration techniques, data analysis, and report writing. *Preq:* M E 202 (or concurrent enrollment), 203 (or concurrent enrollment), PHYS 221.

M E H300 Junior Honors Seminar 0 Acquaints students enrolled in Departmental Honors Program with current research activities in the Department of Mechanical Engineering. Faculty provide seminars where research interests are summarized. These seminars are planned to prepare students in choosing a research topic for the senior thesis. *Preq:* Departmental Honors student with Junior standing.

M E 301 Materials for Mechanical Engineering Applications 3(3,0) Properties and selection of materials of interest to mechanical engineers. Emphasis is on the interrelations between the microstructure, processing, and properties of materials. *Preq:* CH 102, E M 304 (or concurrent enrollment).

M E 303 Thermodynamics 3(3,0) Study of the second law and entropy; applications to fixed mass systems and control volumes; vapor and gas power cycles; mixtures of gases; vapor psychrometrics; combustion and the third law. Thermochemical equilibrium. *Preq:* M E 203.

M E 304 Heat Transfer 3(3,0) Steady and transient heat conduction, free and forced convection, radiation, and multi-mode heat transfer. Emphasis is on analytical and numerical solutions to engineering heat transfer problems with a design orientation. *Preq:* E M 320 and either M E 203 or 311.

M E 305 Modeling and Analysis of Dynamic Systems 3(3,0) Techniques for developing and analyzing physical and mathematical models of mechanical and electromechanical systems are presented. Transient and frequency response are determined using analytical and numerical methods. Basic feedback systems are introduced. *Preq:* E C 307, E M 202, M E 202, 205, MTHSC 208.

M E 306 Fundamentals of Machine Design 3(3,0) Introduction to failure theory, fatigue analysis, and energy methods for deflection analysis. Integration of these topics with selected portions of mechanics of materials and application of them to the design and analysis of machine elements. *Preq:* E M 304.

M E 310 Thermodynamics and Heat Transfer 3(3,0) Introduction to thermodynamics and heat transfer for nonmajors: properties of liquids and gases, first and second law analysis, introduction to cycles for power and refrigeration, heat flow by conduction and radiation, and convective heat flow and heat exchangers. *Preq:* Junior standing in an Engineering curriculum.

M E 322 Mechanical Engineering Laboratory II 2(1,3) Mechanical engineering principles and phenomena are reinforced through student conducted experiments. Presentation of fundamentals of instrumentation, calibration techniques, data analysis, and report writing in the context of laboratory experiments. *Preq:* E M 304 (or concurrent enrollment), 320 (or concurrent enrollment), M E 303 (or concurrent enrollment), ME 221, MTHSC 208.

M E 323 Mechanical Engineering Lab III 2(1,3) Continuation of M E 322. Mechanical engineering principles and phenomena will be reinforced through student conducted experiments. Presentation of fundamentals of instrumentation, calibration techniques, data analysis, and report writing in the context of laboratory experiments. *Preq:* M E 301 (or concurrent enrollment), 304 (or concurrent enrollment), 305 (or concurrent enrollment), 306 (or concurrent enrollment), M E 322, MTHSC 302 or EX ST 411.

M E 400 Senior Seminar 1(1,0) Seminars address the problems encountered by engineering graduates in professional practice. Invited lecturers as well as faculty provide the lectures and demonstrations. *Preq:* All required 300-level ECE, EM, and ME courses or approval of instructor.

M E 401 Mechanical Engineering Design 3(3,0) [O.1, W.2] Project oriented course in mechanical engineering. Emphasis is on the role of analysis, synthesis, and evaluation in design and on written reporting of design solutions. Influence of economics and optimization, concurrent development, integration of design and manufacturing, and system creation are utilized for engineering design decisions. *Preq:* M E 301, 303, 304, 305, 306 (concurrent enrollment in one of these courses is permitted with departmental approval.)

M E 402 Internship in Engineering Design 3(1,6) [O.2, W.1] Creative application of general engineering knowledge in solving an open-ended design problem provided by a sponsor typically external to the University. Progress is evaluated by a faculty jury. Students present results to the jury and sponsor through written reports and oral presentations addressing University written/oral competency goals. *Preq:* M E 401, 404 (or concurrent enrollment).

M E 404 Manufacturing Processes and Their Application 3(3,0) Fundamental principles associated with production processes and their application to the manufacture of products from metals, polymers, ceramics, and composites. Emphasizes the physical and quantitative aspects of processing, the selection of processes to create products, and the identification of processes used to manufacture existing products. *Preq:* M E 301, 303, 304, 305, 306, 323.

M E 405 Kinematics and Dynamics of Machinery 13(3,0) Graphical, analytical, and numerical techniques are used in the dynamic analysis and synthesis of machines. Emphasis on the application of these analysis techniques to planar linkages. *Preq:* E M 202, 304, and M E 205.

M E 407, 607 Applied Heat Transfer 3(3,0) Application oriented extension of M E 304, considering topics in transient conduction, flow of fluids, energy exchange by radiation, and mass transfer. Applications in heat-exchanger design with

emphasis on economics and variation of operating conditions from the design point. *Preq:* M E 304 and consent of instructor.

M E 415, H415 Undergraduate Research 1-3 Individual research projects to be conducted under the direct supervision and guidance of a faculty member. May be repeated for a maximum of six credits. *Preq:* Consent of instructor.

M E 416 Control of Mechanical Systems 3(3,0) Physical modeling and feedback principles are presented for control of mechanical systems. Transient response, root locus and frequency response principles are applied to the control of basic mechanical systems such as electric motors, fluid tanks, or thermal processes. PID control laws are emphasized. *Preq:* M E 305, 322, 323.

M E 417, 617 Control Systems Design 3(2,1) Analytical, simulation, and experimental methods are applied to control system design. Fundamentals of linear state variable and computer-control systems are introduced. Laboratory emphasis is placed on control-systems performance measurement, and control-system implementation including sensors and actuators. *Preq:* M E 416 or consent of instructor.

M E 418 Finite Element Analysis in Mechanical Engineering Design 3(2,3) Introduction to the finite element method. Introduction to solid modeling, finite element modeling and analysis using commercial codes. Analysis strategies using finite elements. Applications to heat transfer, fluid flow and structures. *Preq:* E M 304, 320, M E 205, 304, or consent of instructor.

M E 420, 620 Energy Sources and Their Utilization 3(3,0) Covers availability and use of energy sources such as fossil fuels, solar (direct and indirect) and nuclear; addresses energy density and constraints to use (technical and economic) for each source. *Preq:* M E 303, 304.

M E 421, 621 Introduction to Compressible Flow 3(3,0) Introductory concepts to compressible flow; methods of treating one-dimensional gas dynamics including flow in nozzles and diffusers, normal shocks, moving and oblique shocks, Prandtl-Meyer Flow, Fanno Flow, Rayleigh Flow, and reaction propulsion systems. *Preq:* E M 320, M E 303.

M E 422, 622 Design of Gas Turbines 3(3,0) Guiding principles in gas turbine cycles are reviewed. Turbine and compressor design procedures and performance prediction for both axial and radial flow machines are presented. Methods of design of rotary heat-exchangers and retrofitting gas turbine for regenerative operation are presented. Design projects are used to illustrate the procedures. *Preq:* E M 320.

M E 423, 623 Introduction to Aerodynamics 3(3,0) Basic theories of aerodynamics are presented with the purpose of accurately predicting the aerodynamic forces and moments which act on a vehicle in flight. *Preq:* E M 320.

M E 424 Mechanical Engineering Laboratory IV 1(0,3) Continuation of M E 323. Mechanical engineering principles and phenomena are reinforced through open-ended, student designed and conducted experiments. Utilization of mature skills in measurement techniques, data analysis, and report writing. *Preq:* M E 301, 303, 304, 305, 306, and 323; M E 404 (or concurrent enrollment).

M E 425, 625 Kinematics and Dynamics of Machinery II 3(3,0) Graphical, analytical, and numerical techniques are used in the dynamic analysis and synthesis of machines. Emphasis is on the application of the analysis techniques to cams, gears, and other mechanisms. *Preq:* M E 405.

M E 429, 629 Thermal Environmental Control 3(3,0) Mechanical vapor compression refrigeration cycles, refrigerants, thermoelectrical cooling systems, cryogenics, thermodynamic properties of air, psychometric charts, heating and cooling coils, solar radiation, heating and cooling loads, insulation systems. *Preq:* E M 320, M E 303.

M E 431 Applied Fluids Engineering 3(3,0) Applications-oriented course in industrial fluids engineering, primarily directed toward the analysis and design of piping systems and components for liquid and gas flow. Topics include friction factors, head loss, flow capacities, piping networks, flow measurement, pumps, control valves, and hydraulic and pneumatic components. *Preq:* E M 320, M E 322, 323.

M E 440 Materials for Aggressive Environments 3(3,0) Emphasizes the engineering aspects of selecting materials for applications in aggressive environments. Various types of materials degradation are discussed as are methods for waste prevention, including especially engineering design and materials selection approaches. Structural metallic alloys are emphasized; however, technically important ceramics and polymers are also discussed. *Preq:* M E 301, 306.

M E 453, 653 Dynamic Performance of Vehicles 3(3,0) Introduces techniques for analyzing the dynamic behavior of vehicles. Types of vehicles to be considered are chosen from aircraft, surface ships, automobiles and trucks, railway vehicles, and magnetically levitated vehicles. *Preq:* M E 205, 305, or consent of instructor.

M E 454, 654 Design of Machine Elements 3(3,0) Design of common machine elements including clutches, brakes, bearings, springs, and gears. Optimization techniques and numerical methods are employed as appropriate. *Preq:* M E 306 or consent of instructor.

M E 455, 655 Design for Computer-Automated Manufacturing 3(3,0) Concepts of product and process design for automated manufacturing are considered. Topics include product design for automated manufacturing, inspection and assembly, using automation, industrial robots, knowledge-based systems and concepts of flexible product manufacture. *Preq:* M E 301, 306, and 404 (or concurrent enrollment), or consent of instructor.

M E (C E) 456 Fundamentals of Robotics 3(3,0) Introduction to the fundamental mechanics and control of robots, including their application to advanced automation. Topics include robot geometry, kinematics, dynamics, and control. Planar machine structures are emphasized, including methods using computer analysis. Application considerations include the design and operation of robot systems for manufacturing and telerobotics. *Preq:* M E 305, 416 (or concurrent enrollment), or consent of instructor.

ME 471 Computer Aided Engineering Analysis and Design 3(3,0) Students are exposed to geometric and solid modeling, finite elements, optimization, and rapid-prototyping. Students design an artifact, represent it on the computer, analyze it using FEA, then optimize before prototyping it. Emphasizes the use of computer-based tools for engineering design. The World Wide Web is used for reporting. *Preq:* Numerical methods and programming experience or consent of instructor.

ME 493, 693 Selected Topics in Mechanical Engineering 1-6 (1-6,0) Study of topics not found in other courses. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Consent of instructor.

MEDICAL TECHNOLOGY

Coordinator: M. V. Ruppert

Baptist Medical Center (Columbia)

Adjunct Associate Professor: H. F. Henderson;

Adjunct Assistant Professor: J. M. Savage

McLeod Regional Medical Center (Florence)

Adjunct Associate Professor: V. Hyman; *Adjunct*

Assistant Professor: V. T. Anderson

MT 101 Introduction to Medical Technology 11(0) Introduction to the operation and practices in a medical laboratory. Integrates the academic year with the clinical year. Included are lectures on current laboratory practices, a visit to a modern medical laboratory, current training of laboratory personnel and seminars on areas of specialization.

MT 401 Immunology 3(2,4) Presents the principles of serology and immunology and the tests utilizing these principles to detect abnormalities helpful in the diagnosis of disease. *Preq:* Senior standing in Medical Technology and enrollment in a clinical program.

MT 402 Clinical Microbiology 8(4,11) Principles of microbiology: bacteriology, mycology, virology, and parasitology. Emphasis is on human pathogenic organisms, using both fresh and prepared organisms. *Preq:* Senior standing in Medical Technology and enrollment in a clinical program.

MT 403 Hematology and Hemostasis 5(3,7) Information on blood as a tissue, the theory of hematological and hemostasis (coagulation) tests, factors that affect test reliability. Knowledge of blood dyscrasias. Skill in the performance of hematological and hemostasis tests is emphasized, and the use of automation techniques is covered. *Preq:* Senior standing in Medical Technology and enrollment in a clinical program.

MT 404 Blood Bank 4(2,6) History and principles of blood-group systems and methods of cross matching. Selection, pretesting, and bleeding of donors and processing of blood for transfusions, including component therapy. *Preq:* Senior standing in Medical Technology and enrollment in a clinical program.

MT 407 Urinalysis 2(1,3) Study of renal function together with principles of urine analysis and anatomy of the urinary system. Emphasis is placed on laboratory procedures and their utilization to detect abnormalities helpful in the diagnosis of disease. *Preq:* Senior standing in Medical Technology and enrollment in a clinical program.

MT 408 Clinical Chemistry 10(6,14) Chemical principles as applied to the analysis of biochemical substances and to physiological processes of clinical importance. Emphasis is on the chemistry of blood and urine. Advanced laboratory instruments, statistical analysis, and quality control concepts are covered. *Preq:* Senior standing in Medical Technology and enrollment in a clinical program.

MT 491 Special Topics in Medical Technology 2(1,4) Some or all of the following topics are covered during the clinical experience: cell physiology, educational principles, laboratory management, scientific reports, research problems, etc. The manner in which the accredited hospital administers the special topics varies somewhat due to institutional differences. *Preq:* Senior standing in Medical Technology and enrollment in a clinical program.

MT 495 Medical Technology Clinical Studies 0-17 General enrollment course for students in hospital phase. Specific medical technology credits awarded at end of clinical year. *Preq:* Senior standing in Medical Technology.

MICROBIOLOGY

Professors: J. D. Gangemi, S. S. Hayasaka, *Chair*; R. H. Hilderbrand, T. A. Hughes, E. L. Kline, L. L. Larcum, J. W. Lawson, Jr., M. J. B. Paynter, T. E. Schwedler, F. J. Stutzenberger, T. R. Wilkinson; *Assistant Professors:* W. Y. Chen, M. W. Kilgore; *Lecturer:* T. R. Tzeng

MICRO 100 Microbes and Human Affairs 1(1,0) Explanation of the roles of microorganisms in today's world and the significance of microbes to the future of mankind.

MICRO 205 Introductory Microbiology 4(3,3) Basic concepts of microbiology are introduced through classroom and laboratory experiences. Emphasis is on practical applications in various areas of importance to man. Recommended for students not majoring in a biological science. Not open to Microbiology majors. *Preq:* CH 101 and 102, BIOL 103.

MICRO 305, 605 General Microbiology 4(3,3) Morphology, physiology, classification, distribution, and cultivation of microorganisms. *Preq:* Introductory biology, CH 101 and 102.

MICRO 400, 600 Public Health Microbiology 3(3,0) Epidemiology of transmissible diseases including pathogenic characteristics of the infectious organism, modes of transmission, mechanism of infection, diagnostic aids, effective treatments, immunizing procedures and methods of preventing infection. *Preq:* MICRO 305.

MICRO 401, H401, 601 Advanced Bacteriology 4(2,6) Metabolism, nutrition, growth, and death of bacteria; microbiological assays and industrial fermentation; emphasis on laboratory procedures for the identification of the more common taxonomic groups. *Preq:* CH 201 or 223, 227, MICRO 305.

MICRO 403, 603 Marine Microbiology 3(2,3) Discussion of the microbes that inhabit the marine environment, their peculiar physiological traits, and contributions to the ecology of oceans. *Preq:* MICRO 305, organic chemistry.

MICRO 407, H407, 607 Food and Dairy Microbiology 4(3,3) Physical-chemical factors limiting survival and growth of microorganisms during processing and manufacturing of food and dairy products. Standard methods for enumerating and identifying indicator bacteria, yeasts, molds, and microbes producing food and food-borne illness. Starter cultures, fungal toxins, microbial cell injury and standards for food and dairy products. *Preq:* BIOCH 210 or CH 201 or 223, MICRO 305.

MICRO 410, H410, 610 Soil Microbiology 3(2,3) Role of microorganisms in the decomposition of organic substances, transformation of nitrogen and mineral substances in the soil, interrelationships between higher plants and microorganisms; importance of microorganisms in soil fertility. *Preq:* MICRO 305.

MICRO 411, H411, 611 Pathogenic Bacteriology 4(3,3) Study of pathogenic bacteria, their morphology, cultural requirements and classification; diagnostic tests, methods of differentiation, and the diseases caused. *Preq:* MICRO 305.

MICRO 412, H412, 612 Bacterial Physiology 4(3,3) Consideration of the cytology, physiology, metabolism, and genetics of bacteria. Includes studies of growth and death, reproduction and mutation, nutrition and metabolic pathways, regulatory mechanisms, and effects of environment. *Preq:* CH 224, MICRO 305, one semester of biochemistry, or consent of instructor.

MICRO 413, H413, 613 Industrial Microbiology 3(2,3) Microbial aspects of large-scale processes for the production of foods, antibiotics, enzymes, fine chemicals, and beverages. Topics include strain selection, culture maintenance, biosynthetic pathways, continuous cultivation and production of single cell protein. *Preq:* MICRO 305.

MICRO 414, H414, 614 Basic Immunology 3(2,3) Consideration of the nature, production, and function of basic immune responses in animals. Procedures and mechanisms of antigen-antibody and other immune reactions. *Preq:* MICRO 305, organic chemistry.

MICRO 415, H415, 615 Microbial Genetics 4(3,3) Cytological basis of bacterial, fungal, and viral genetics; molecular aspects; mutations; mechanisms of genetic transfers; episomes and plasmids; and population changes. *Preq:* BIOCH 301, CH 224, MICRO 305, or consent of instructor.

MICRO 416, H416, 616 Introductory Virology 3(3,0) General introduction to the field of virology, including animal, bacterial, and plant viruses. Topics include nomenclature and classification, biochemical and biophysical characteristics, mechanisms of replication, chemotherapy, and techniques for isolation, assay, and purification. *Preq:* BIOCH 301, MICRO 305, or consent of instructor.

MICRO 417, H417, 617 Molecular Mechanisms of Carcinogenesis and Aging 3(3,0) Changes which occur at the cellular and subcellular levels during transformation and aging. Accumulated damage and "intrinsic clock" theories of aging; genetic and epigenetic theories of carcinogenesis; epidemiology of cancer; viral, radiation-induced, and chemical carcinogenesis; the immune system and cancer. *Preq:* BIOCH 301, MICRO 305, or consent of instructor.

MICRO 418, 618 (BIOSC, GEN) Biotechnology I: Nucleic Acids Techniques 4(2,4) See BIOSC 418.

MICRO 419, 619 Selected Topics in Molecular Medicine 3(3,0) Introduction to various areas of molecular medicine. Examines the latest research and developments in molecular medicine. Designed for students interested in medicine and biomedical research. Graduate students may repeat for a total of six credits. *Preq:* MICRO 305, BIOCH 301, or permission of instructor.

MICRO 491 Special Problems in Microbiology 1-3(0,3-9) Research problems in various areas of microbiology which introduce undergraduate students to the planning and execution of research experimentation and the presentation of research findings.

MILITARY SCIENCE

Professor: W. R. Hanson, *Chair*; *Assistant Professors:* D. M. Bedard, R. L. DuBreuil, K. G. Mangan, E. Moore, Jr.

M S 101 Military Science (Basic) 1(1,2) Examines the role of the Army in today's society, ranks and branches of the Army, principles and techniques of leadership. Laboratory periods provide training in physical conditioning, mountaineering, and weapons safety and firing. One-hour lecture per week; two-hour laboratory every other week or equivalent.

M S 102 Military Science (Basic) 1(1,2) Study of Army organization and doctrine with additional focus on pay and allowances, other forces, the non-commissioned officer, and fundamentals of first aid. Laboratories provide training in mountaineering, weapons safety and firing, and land navigation.

M S 201 Military Science (Basic) 1(1,2) Introductory study of U.S. Military Weapons Systems. Emphasis is on the historical and practical perspectives of current U.S. Army weaponry. Leadership laboratory provides students practical experience in applying principles learned and experience in leadership and physical fitness.

M S 202 Military Science (Basic) II 1(1,2) Introduction to principles of warfare and introduction to military land navigation. Leadership laboratory provides students practical experience in applying principles learned in class, in addition to experience in leadership and physical training.

M S 301 Military Science (Advanced) 1(1,1) Small unit tactics: analysis of the leader's role in directing and coordinating small units in the execution of offensive and defensive tactical missions. Cadets participate in leadership laboratory training throughout the school year.

M S 302 Military Science (Advanced) 2(2,1) Organizational leadership and methods of instruction. Study of relevant theories and concepts of organizational leadership and human behavior; techniques used in planning and presenting instruction. Continuation of leadership laboratory.

M S 401 Military Science (Advanced) 1(1,1) Study of military operations, with emphasis on small unit leadership, training, and administration. Subject matter and leadership laboratories provide requisite knowledge and experience for commissioning and initial military assignment.

M S 402 Military Science (Advanced) 2(2,1) Continuation of M S 401, with emphasis on military justice, law of warfare, and ethics. Subject matter and leadership laboratories are designed to provide requisite knowledge and experience for commissioning and initial military assignment.

MUSIC

Professors: R. E. Goodstein, *Chair*; L. U. Harder; *Associate Professors:* N. M. Hosler, D. R. Rash; *Assistant Professors:* A. R. Levin, L. L. Li-Beuel, F. T. Sinclair; *Instructor:* P. L. Buyer

MUSIC 101 Beginning Class Piano I 1(0,2) Thorough introduction to basic keyboard skills including solo and ensemble repertoire, technique, applied keyboard theory, and performance. Applied music fee is assessed. *Preq:* Consent of instructor.

MUSIC 102 Beginning Class Piano II 1(0,2) Continued work on keyboard skills, applied keyboard theory, solo and ensemble repertoire, and performance. Applied music fee is assessed. *Preq:* MUSIC 101 or consent of instructor.

MUSIC 151 Applied Music 1(0,1) Individual study in performance medium (piano, voice, strings, woodwinds, brass, percussion). One 30-minute private lesson each week, for which a minimum of four hours practice is required. May be repeated for credit with departmental approval of differing performance media. Applied music fee is assessed. *Preq:* Consent of instructor, based upon a qualifying audition.

MUSIC 152 Applied Music 1(0,1) Continuation of MUSIC 151. May be repeated for credit with departmental approval of differing performance media. Applied music fee is assessed. *Preq:* MUSIC 151.

MUSIC 205 Music Theory 3(3,0) Terminology and notation of traditional music are reviewed, and the techniques of sight-singing and melodic dictation are practiced. Harmonic practices are studied, relating to the principal diatonic triads in all inversions. *Preq:* Consent of instructor, based on musical literacy.

MUSIC 206 Music Theory 3(3,0) Continuation of MUSIC 205 with emphasis on diatonic triads and seventh chords in all inversions, nonchord tones, and basic elements of musical form. Practice in sight singing, melodic dictation, and harmonic dictation is included. *Preq:* MUSIC 205.

MUSIC 210, H210 Music Appreciation: Music in the Western World 3(3,0) Deepens students' appreciation of their musical heritage through study of the elements of the musical language and its development in Western culture.

MUSIC 251 Applied Music 1(0,1) Continuation of MUSIC 152. Applied music fee is assessed. *Preq:* MUSIC 152 and consent of instructor.

MUSIC 252 Applied Music 1(0,1) Continuation of MUSIC 251. Applied music fee is assessed. *Preq:* MUSIC 251 and consent of instructor.

MUSIC 279 Music Laboratory 1(0,3) Practical work in music on productions designed for public presentation. Emphasis is placed on sound support, amplification, and mixing. May be repeated for a maximum of four credits.

MUSIC 311 Music Appreciation: American Music 3(3,0) Music in America from 1620 to the present. Indigenous and borrowed influences are examined.

MUSIC 312 Introduction to Jazz 3(3,0) Comprehensive survey of jazz elements and styles. A historical perspective from Dixieland to bebop to jazz/rock is included.

MUSIC 313 History of Rock and Roll 3(3,0) Comprehensive survey of rock elements, styles, and artists. Emphasis is on the evolution of rock and roll including a broad examination of musical influences. Course content examines how rock and roll both reflected and influenced social issues.

MUSIC 314 World Music 3(3,0) Introduction to ethnomusicology and music of the world's peoples. Emphasis is placed on music through culture.

MUSIC 315 Music History 3(3,0) Development of Western music from antiquity to 1750, emphasizing representative literature from various styles and periods. *Preq:* MUSIC 210 or consent of instructor.

MUSIC 316 Music History 3(3,0) Continuation of MUSIC 315. Music from 1750 to the present. *Preq:* MUSIC 210 or consent of instructor.

MUSIC 321 Principles of Piano Performance I 3(3,0) In-depth study of the principles of piano performance focusing on how to interpret a musical score, develop technical skills and practice techniques, and use the body correctly at the keyboard. *Preq:* By audition.

MUSIC 322 Principles of Piano Performance II 3(3,0) Continuation of MUSIC 321. *Preq:* MUSIC 321 or consent of instructor.

MUSIC 323 Piano Accompanying I 1(0,3) Group study in piano accompanying. Focus on sight-reading and choral, vocal, and instrumental accompanying. Students take group lessons and accompany choral groups and/or applied music students. May be repeated for a maximum of eight credits. *Preq:* Consent of instructor.

MUSIC 331 Pep Band 1(0,3) Ensembles: devoted to the musical training of ensemble members through reading and rehearsal of appropriate music; public performances given in addition to the minimum rehearsal time. May be repeated for credit with a maximum of eight hours of ensemble credit allowable toward a degree. Simultaneous enrollment in multiple sections allowed. *Preq:* Consent of director.

MUSIC 332 Woodwind Quintet 1(0,3) Ensembles: advanced study of woodwind chamber music media. One one-hour class meeting each week, for which a minimum of two hours of ensemble practice is required. May be repeated for credit with a maximum of eight credits of ensemble allowable toward a degree. Concurrent enrollment in MUSIC 362. *Preq:* By audition only. *Coresq:* MUSIC 362.

MUSIC 333 String Quartet 1(0,3) Ensembles: advanced study of string quartet repertoire. Two 90-minute meetings each week for which a minimum of two hours of practice is required. May be repeated for credit with a maximum of eight credits of ensemble allowable toward a degree. *Preq:* By audition only. *Coresq:* MUSIC 369 and Applied Music.

MUSIC 334 Flute Choir 1(0,3) Ensembles: study of flute ensemble literature. One 60-minute meeting each week for which a minimum of two hours of practice is required. May be repeated for credit with a maximum of eight credits of ensemble allowable toward a degree. *Prq:* By audition only.

MUSIC 351 Applied Music 1(0,1) Continuation of MUSIC 252. Students are required to perform an appropriate solo in a student recital. Applied music fee is assessed. *Prq:* MUSIC 252 and consent of instructor.

MUSIC 352 Applied Music 1(0,1) Continuation of MUSIC 351. Students are required to perform an appropriate solo in a student recital. Applied music fee is assessed. *Prq:* MUSIC 351 and consent of instructor.

MUSIC 361 Marching Band 1(0,3)¹ Ensembles: devoted to musical training of ensemble members through reading and rehearsal of appropriate music; public performances given periodically in addition to the minimum rehearsal time. May be repeated for credit with a maximum of eight hours of ensemble credit allowable toward a degree. Fall semester only. *Prq:* Consent of director.

MUSIC 362 Symphonic Band 1(0,3)¹ Ensembles: devoted to the musical training of ensemble members through reading and rehearsal of appropriate music; public performances given periodically in addition to the minimum rehearsal time. May be repeated for credit with a maximum of eight hours of ensemble credit allowable toward a degree. *Prq:* Consent of director.

MUSIC 363 Jazz Ensemble 1(0,3)¹ Ensembles: devoted to the musical training of ensemble members through reading and rehearsal of appropriate music; public performances given periodically in addition to the minimum rehearsal time. May be repeated for credit with a maximum of eight hours of ensemble credit allowable toward a degree. *Prq:* Consent of director.

MUSIC 364 Concert Band 1(0,2)¹ Devoted to the musical training of ensemble members through reading and rehearsal of appropriate music; public performances given periodically in addition to the minimum rehearsal time. May be repeated for credit with a maximum of eight credits of ensemble allowable toward a degree. *Prq:* Consent of director.

MUSIC 365 University Chorus 1(0,3)¹ Ensembles: devoted to the musical training of ensemble members through reading and rehearsal of appropriate music; public performances given periodically in addition to the minimum rehearsal time. May be repeated for credit with a maximum of eight hours of ensemble credit allowable toward a degree. *Prq:* Consent of director.

MUSIC 366 Vocal Jazz Ensemble 1(0,3)¹ Ensembles: devoted to the musical training of ensemble members through reading and rehearsal of appropriate music; public performances given periodically in addition to the minimum rehearsal time. May be repeated for credit with a maximum of eight hours of ensemble credit allowable toward a degree. *Prq:* Consent of director.

MUSIC 367 Chamber Singers 1(0,3)¹ Ensembles: devoted to the musical training of ensemble members through reading and rehearsal of appropriate music; public performances given periodically in addition to the minimum rehearsal time. May be repeated for credit, with a maximum of eight hours of ensemble credit allowable toward a degree. *Prq:* Consent of director.

MUSIC 368 Small Ensemble 1(0,3)¹ Ensembles: devoted to the musical training of instrumental, vocal ensemble members through reading and rehearsal of appropriate music; public performances given periodically in addition to the minimum rehearsal time. May be repeated for a maximum of eight credits. Enrollment in simultaneous sections is allowed. *Prq:* Consent of director.

MUSIC 369 Symphony Orchestra 1(0,3)¹ Mid-sized, college-community orchestra devoted to performing works from standard repertoire. Weekly evening rehearsals with one or more performances per semester. May be repeated for credit with a maximum of eight hours of ensemble credit allowable toward a degree. *Prq:* Consent of director.

MUSIC 398 Special Topics in Music 3(3,0) Consideration of select areas of study in music not addressed by other music course offerings. May be repeated once for credit. *Prq:* Consent of instructor.

MUSIC 400 Music in the Elementary Classroom 3(3,0) Gives teachers in the elementary classroom a familiarity with traditional, Kodaly, Orff, and Kindermusik approaches in correlating music with language arts, mathematics, and social studies.

MUSIC 404 MIDI Applications 3(3,0) Exploration of MIDI (Musical Instrument Digital Interface) through music notation and sequencing. Students have hands-on experience producing printed scores and sequences on the computer and selected software. *Prq:* MUSIC 205 or consent of instructor.

MUSIC 451 Applied Music 1(0,1) Continuation of MUSIC 352 for exceptional students, guiding the student in interpretation of advanced solo and ensemble literature. A minimum of eight hours weekly practice is required. Students are also required to perform an appropriate solo in a student recital. Applied music fee is assessed. *Prq:* MUSIC 352 and consent of instructor.

MUSIC 452 Applied Music 1(0,1) Continuation of MUSIC 451. Students are required to present a recital. Applied music fee is assessed. *Prq:* MUSIC 451 and consent of instructor.

MUSIC 499 Independent Studies 1-3(1-3,0) Tutorial work for students with special interests in music study outside the scope of existing courses. May be repeated for a maximum of six credits. *Prq:* Consent of department chair.

¹No more than a total of eight semester hours earned in this group of courses may be used in meeting degree requirements: MUSIC 361, 362, 363, 364, 365, 366, 367, 368, 369.

NURSING

Professors: O. S. Hipps, R. B. Hughes, E. J. Lee, B. N. Logan, *Director;* E. J. Murrow, S. M. Oldaker, *Associate Professors:* D. A. Bechtel, C. L. Belcher, B. J. Holder, K. A. Kemper, N. K. Meehan, M. P. Miller, F. M. Oglesby, V. G. Parker, A. B. Privette, R. H. Pruitt, M. B. Reichenbach, P. A. Smart, R. A. Spadoni, S. W. Thompson, M. J. Thorson, J. L. Timms, S. D. M. Van Sell, D. F. Willoughby, *Assistant Professors:* R. L. Carr, J. S. Gillespie, K. Goldstein, *Research Associate:* M. A. Wetsel, *Lecturers:* P. A. Borchway, K. M. Brown, R. F. Collins, C. H. Craig, L. Crew, S. G. Dickson, L. M. Gibson, K. P. Hardin, E. N. Hatfield, E. R. Hearn, C. W. Lee, E. F. Macfie, M. A. Mullaney, A. Rochester, E. Swanson, J. E. Ward, *Visiting Assistant Professor:* P. R. Maybee

NURS 140 Computer Applications in Health Care 3(3,0) [C.3] Introduces students to the application of computers in the delivery of health care. Covers existing health-care applications and forecasts future needs. Multiple computer systems are discussed. Nursing majors will be given enrollment priority.

NURS 300 Seminar in Health Care Topics 1-4 (1-4,0-9) Provides individualized in-depth study in a selected health-care area; may have a clinical component and/or special projects. Open to non-Nursing majors. May be repeated for a maximum of six credits. *Prq:* Consent of instructor.

NURS 303 Nursing of Adults 7(3,8) Incorporates theoretical and empirical knowledge from the physical and social sciences. Uses critical thinking to provide holistic, safe, individualized nursing care to adults, including health promotion, maintenance, restoration and health teaching. *Prq:* NURS 304, 310, 312, 340. *Coreq/Prq:* NURS 320.

NURS 304 Pathophysiology for Health-Care Professionals 3(3,0) Focuses on disease mechanisms and recognition of the manifestations of these mechanisms in body systems. Discussion also includes pharmacologic and mechanical interventions commonly associated with specific disease processes and application to patient-care situations. *Prq:* BIOSC 223, consent of instructor.

NURS 305 Psychosocial Nursing 3(3,0) Lifespan approach to examine psychosocial, developmental, family, and cultural factors that influence individuals from diverse populations and their families in the promotion, maintenance, and restoration of health. The use of the nursing process, critical thinking, therapeutic communication, and psychosocial nursing interventions is explored.

NURS 307 Family Nursing in the Community 5(4,2) Bridge course for registered nurse students focusing on nursing care of families including childbearing clients, infants, children, adolescents, adults, and older adults in the context of the community. Major emphasis is on strategies to assist individuals to achieve or maintain wellness in the family, home, and community environment. *Prq:* Admission to RN/BS Completion Program, NURS 304 (or concurrent enrollment) and 313 (or concurrent enrollment).

NURS 310 Health Assessment 3(2,2) Introduces concepts of health, wellness, and illness. Focuses on physical, psychosocial, and cultural assessment for the well adult client with variations across the life span. Includes interviewing techniques. *Preq:* All required non-nursing courses and electives.

NURS 311 Introduction to Community Nursing 2(2,0) Focuses on health promotion and illness prevention activities across the life span for individual and families in the community. Major emphasis is on nursing's role in the acquisition and maintenance of health as well as the identification and modification of health risk factors. *Preq:* NURS 304, 310, 312, 340. *Coreq/Preq:* NURS 320.

NURS 312 Therapeutic Nursing Interventions 4(2,4) Focus on therapeutic nursing interventions, including selected psychomotor skills, communication skills, and teaching/learning. *Preq:* All required non-nursing courses and electives.

NURS 313 Health Assessment Through the Life Span 4(3,2) Expands on RNs' knowledge of health assessment. Focuses on physical and psychosocial assessment for the well client throughout the life span. Interviewing techniques are included.

NURS 320, H320 Professionalism in Nursing 2(2,0) [W.1] Application of critical thinking skills in the professional nursing roles in multidisciplinary approaches to health care. Analysis of the historical development of modern nursing. Examination of issues of nursing care to diverse populations within context of ethical and professional standards. *Preq:* All required non-nursing courses and electives.

NURS 323 Gerontology Nursing 2(2,0) Introduction of theories of aging. Focus on complex health care issues of aging and chronic care including promotion, maintenance, and restoration of health of the elderly. Scientific concepts address physiological, psychological, and sociological issues of aging and chronic illness. *Preq:* NURS 310, 312, PSYCH 201, SOC 201. *Preq/Coreq:* NURS 320.

NURS 330, H330 Research in Nursing 3(3,0) [W.1] Introduction to conceptual frameworks, models, and theories related to nursing. Analysis of reported research in nursing and related disciplines. Ethical, moral, and legal issues are discussed in relation to nursing research. *Preq:* NURS 304, 310, 312, 340. *Preq/Coreq:* NURS 320.

NURS 340 Pharmacotherapeutic Nursing Interventions 3(3,0) Focus is on integration of nursing process with pharmacotherapeutics, administration, monitoring, and related client education. Includes major drug classifications, indications for use, side effects, interactions, routes of administration, usual dosages and contraindications. *Preq:* All required non-nursing courses and electives.

NURS (PHIL) 350 Technology and Philosophy in Nursing 3(3,0) Analysis of the influence of the increasing application of scientific technology to health-care delivery and concomitant ethical issues.

NURS 401, H401 Mental Health Nursing 5(3,4) Application of theories and the nursing process to identify, implement, and evaluate nursing interventions for the care of clients with psychiatric disorders. *Preq:* All required 300-level nursing courses.

NURS 403, H403 Complex Nursing of Adults 5(3,4) Focus on the biological, psychological, philosophical, and socio-cultural influences on complex health problems related to acute and traumatic conditions. Emphasis is on the concepts of circulation, oxygenation, homeostasis, and compensation in acutely ill adults. *Preq:* NURS 401, 411, 412.

NURS 405, H405 Leadership and Management in Nursing 3(2,2) [W.1] Focuses on the role of the professional nurse in managing nursing care. Theories and research related to leadership, power, management, organizations, regulation, and ethics are discussed. Directed laboratory experiences are provided. *Preq:* NURS 401, 411, 412.

NURS 406 Issues in Professionalism 3(3,0) [W.1] Analysis of the development of professional nursing. Consideration of educational issues, legal and economic issues, health policy, leadership, cultural variations, and the influence of values in ethical decisions and nursing practice. *Preq:* Admission to RN/BS program.

NURS 408 Senior Nursing Practicum 3(1,4) Impact of selected health issues and problems on the practice of nursing is considered. Licensure preparation, techniques to maintain currency in the field, and other relevant topics facing the professional nurse are presented. Under preceptor supervision, students observe, organize, and implement entry level nursing practice. To be taken Pass/Fail only. *Preq:* NURS 401, 411, 412.

NURS 411, H411 Nursing Care of Children 5(3,4) Focuses on child health problems and health maintenance. Emphasis is on biological, pathophysiological, psychological, and socio-cultural concepts related to nursing care of children with acute, critical, and chronic illnesses. Includes strategies for alleviation of illness, restoration of wellness, promotion and maintenance of health, growth and development. *Preq:* NURS 303, 305, 311, 323, 330.

NURS 412, H412 Nursing Care of Women and Their Families 5(3,4) Focus on health care of women and their families. Emphasis is on biological, psychological, and socio-cultural concepts. Identification of appropriate nursing strategies that enhance individual capacity to achieve or maintain wellness in the family, home, community, and hospital environment. *Preq:* NURS 303, 305, 311, 323, 330.

NURS 415, H415 Community Health Nursing 4(2,4) Consideration of health promotion activities for family and community groups with emphasis on community assessment, screening and health teaching/counseling. Practice activities are related to health promotion in population groups and nursing care of homebound clients. Laboratory settings include homes, schools, industries, and other community organizations. *Preq:* NURS 401, 411, 412.

NURS H420 Senior Honors I 2(2,0) Students develop a proposal for a major thesis, direct study project, or research project under the guidance of a faculty preceptor. *Preq:* Senior Honors standing, NURS H330.

NURS H426 Independent Study 4(2,6) Opportunity for in-depth study in an area of special interest in clinical nursing. Laboratory experience is arranged with the instructor. Specific objectives are to be developed by the student with the consent of the instructor under whom the student wishes to study. *Preq:* All 300-level nursing courses except NURS 300 and consent of instructor.

NURS H428 Senior Honors II 2(2,0) Students implement a proposal for a major directed study project or research thesis under the guidance of a faculty preceptor. *Preq:* Senior Honors Standing, NURS H405, H420.

NURS 485 Nurse Extern Practicum 6(0,18) Practicum consisting of preceptor-supervised and faculty-led nursing clinical experiences in a regional health-care facility. *Preq:* Completion of at least one adult health and one pathophysiology course or consent of instructor.

NUTRITION

(See also courses listed under *Animal and Veterinary Sciences*, *Biochemistry*, and *Food Science*.)

Professors: J. A. Bertrand, A. B. Bodine II, D. L. Cross, D. M. Henriksen, L. W. Hudson, T. C. Jenkins, M. E. Kunkel, J. C. McConnell, Jr., D. V. Maurice; *Associate Professor:* K. L. Cason; *Assistant Professor:* V. J. Haley-Zitlin; *Instructor:* R. M. Haliena

NUTR 203 Principles of Human Nutrition 3(3,0) Principles of nutrition including functions, digestion, and requirements of nutrients; factors affecting food choices and dietary adequacy; and roles of nutrition in physical fitness and health maintenance. May not be substituted for NUTR 401.

NUTR 210 Nutrition and Physical Activity 3(3,0) Topics include role of carbohydrates, fats, and proteins on energy utilization during exercise; altering body composition and improving fitness with diet and physical activity; importance of fluid intake on performance; effectiveness of dietary supplements and ergogenic aids; and choosing a diet appropriate for individual physical activity levels. *Preq:* BIOL 101 and 102, or equivalent.

NUTR 211 Nutrition Throughout the Life Cycle 3(3,0) Topics include nutrition needs during pregnancy, infancy, childhood, adulthood, and aging; diet selection appropriate for each of those stages; and controversies concerning dietary effects on heart disease, cancer, immune system function, and weight control. *Preq:* BIOL 101 and 102, or equivalent.

NUTR 401, H401, 601 Fundamentals of Nutrition 3(3,0F) Biochemical and physiological fundamentals of nutrition applicable to domestic animals and man. Considered are digestive processes, and absorption and metabolism of carbohydrates, lipids, proteins, water, minerals, and vitamins. Energy metabolism and comparative anatomy and physiology of digestive systems are discussed. *Preq:* BIOCH 210, CH 223, or consent of instructor.

NUTR 420 Selected Topics in Nutrition 1-3(1-3,0) Comprehensive study of special topics in nutrition not covered in detail or contained in other courses. Current developments in each area are stressed. May be repeated for a maximum of three credits, but only if different topics are covered. *Preq:* Senior standing or consent of instructor.

NUTR 421 Special Problems in Nutrition 1-4 (0,3-12) Independent research investigation in nutrition. Special emphasis is on developing a research proposal, conducting the research, and reporting the findings. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Senior standing or consent of the instructor.

NUTR 425, H425, 625 Nutrition and Dietetics 4(3,3) Development of diets to meet human nutritional needs with emphasis on metabolic bases of dietary management of individuals with various disease states. *Preq:* NUTR 451 or equivalent.

NUTR 426, 626 Community Nutrition 3(3,0) Study of the fundamentals of nutrition care delivery in community programs beginning with assessment and problem identification and continuing through the development, implementation, and evaluation of nutrition intervention programs. *Preq:* NUTR 451 or equivalent or consent of instructor.

NUTR 451, H451, 651 Human Nutrition 3(3,0) Essentials of nutrition and principle nutritional deficiency conditions. Factors affecting adequacy of dietary intake, methods of determining nutritional status, development of nutrition standards, and recent advances in human nutrition. *Preq:* BIOCH 210/211 or equivalent or consent of instructor.

NUTR 455, 655 Nutrition and Metabolism 3(3,0) Concepts of metabolism fundamental to understanding normal and therapeutic nutrition are examined. Bioenergetics as well as metabolism of carbohydrates, lipids, amino acids, vitamins, and minerals as they relate to nutrition are discussed. *Preq:* NUTR 451 and BIOCH 210 or 423 or 406 or consent of instructor.

PACKAGING SCIENCE

Professors: R. F. Testin, Chair; R. L. Thomas, P. J. Vergano; *Associate Professors:* F. H. Barron, D. K. Cooksey, K. S. Marsh; *Lecturer:* L. H. Doar, Jr.; *Adjunct Professor:* C. R. Barmore; *Adjunct Associate Professors:* D. H. Johns, H. J. Park; *Adjunct Instructor:* R. R. Perdue

PKGSC 101 Packaging Orientation 1(1,0) Overview of the various principles and practices in packaging science, historical development, packaging as a career.

PKGSC 102 Introduction to Packaging Science 2(2,0) Functions of a package; materials, processes, and technology used in package development; the relationship of packaging to the corporation, consumer, and society as a whole. *Preq:* PKGSC 101 or consent of instructor.

PKGSC 202 Packaging Materials and Manufacturing 3(3,0) Detailed study of packaging materials including glass, metal, metal foils and sheets, wood, paper, paperboard, plastics, composites, adhesives, coatings, cushioning media; their functional properties in packaging application; laminating and combining of different packaging materials. *Preq:* PKGSC 102 or consent of instructor.

PKGSC 204 Container Systems (Rigid and Flexible) 3(3,0) Examination of all the packages and containers used to develop systems to distribute products. Compatibility of product and package,

structural design, costs, and merchandising considerations are stressed. *Preq:* PKGSC 202, 206 (or concurrent enrollment) or consent of instructor.

PKGSC 206 Container Systems Laboratory 1(0,3) Laboratory practice in sample making, designing and constructing various containers. *Preq:* PKGSC 204 (or concurrent enrollment).

PKGSC 316 Application of Polymers in Packaging 3(2,3) Detailed study of polymer chemistry and polymerization technology. Emphasis is on polymers which are significant in packaging. Study includes polymer morphology, rheology, physical properties, and processing methods. *Preq:* PKGSC 204; CH 201 or 223; or consent of instructor.

PKGSC 368, H368 Packaging and Society 3(3,0) Study of the role of packaging in modern-day society. Responsibilities of the packager to protect people and the environment. Package guidelines recommended by civilian and governmental agencies. *Preq:* PKGSC 102 or consent of instructor.

PKGSC 401, 601 Packaging Machinery 3(3,0) Systematic study of machinery used to form, fill, seal, laminate, combine, and print continuous and automated packaging lines and auxiliary material handling equipment, including principles of machine design, operation, selection, and specification. *Preq:* PKGSC 204, PHYS 207 or consent of instructor.

PKGSC 404, H404, 604 Mechanical Properties of Packages and Principles of Package Evaluation 3(3,0) Study of the mechanical properties of packages, principles and standard methods (ASTM, TAPPI) of determining these properties. Evaluation of functional properties of packages including shock and vibration isolation. *Preq:* PHYS 207, PKGSC 204, or consent of instructor.

PKGSC (FD SC) 409 Total Quality Management for the Food and Packaging Industries 3(3,0) See FD SC 409.

PKGSC 420, 620 Package Design and Development 3(3,0) Relationship between packaging and the marketing of consumer goods. Study of the various principles and methods practiced in developing packages, methods used to coordinate package development activities including interfacing with product development, manufacturing, marketing, and purchasing. *Preq:* PHYS 207, PKGSC 404, or consent of instructor.

PKGSC 421 Special Problems in Packaging Science 1-4(0,3-12) Independent research investigations in packaging science related to packaging materials, machinery, design, and applications. Special emphasis is placed on organizing a research proposal, conducting research, and reporting results. May be repeated for a maximum of 15 credits. *Preq:* Consent of instructor.

PKGSC 422 Selected Topics in Packaging Science 1-3(1-3,0) Comprehensive study of selected topics in packaging science not covered in detail or contained in other courses. Contemporary developments in each topic area are stressed. May be repeated for a maximum of 15 credits, but only if different topics are covered. *Preq:* Consent of instructor.

PKGSC 440 Packaging for Distribution 3(3,0) Delivery of a packaged product from point of manufacture to point of sale often involves several shipping methods, e.g., truck, rail, air, or ship. To assure both product protection and lowest cost, students must be familiar with the fundamentals of distribution packaging technology. *Preq:* Senior standing and consent of instructor.

PKGSC 454, 654 Package Evaluation Laboratory 2(0,6) Laboratory experiments to determine properties of packaging materials and to evaluate the performance of packages including shipping tests (shock and vibration). Students learn how to operate standard testing apparatus and becomes familiar with industry-recognized test methods and standards. *Preq:* PKGSC 404 or consent of instructor.

PKGSC 464, H464, 664 Food Packaging Systems 3(3,0) Characteristics and application of various materials and systems used in the packaging of foods. Engineering properties of the materials and methods used to measure properties are emphasized. Consideration is given to packaging systems for specific food applications. *Preq:* Consent of instructor.

PKGSC 466, 666 Food Packaging Systems Laboratory 1(0,3) Laboratory and field exercises on food packaging operations and packaging materials. Methods to evaluate the physical and chemical properties of packaging materials are emphasized. *Preq:* Consent of instructor.

PARKS, RECREATION, AND TOURISM MANAGEMENT

Professors: L. R. Allen, R. H. Becker, G. W. Burnett, L. W. Gahan, W. E. Hammitt, G. E. Howard, A. E. James, Chair; F. A. McGuire, R. W. McLellan, J. R. Pope, Jr.; *Associate Professors:* S. J. Backman, H. J. Grove, J. M. McDonald, M. K. McLellan, T. D. Potts, C. R. White, Jr.; *Assistant Professors:* K. F. Backman, R. D. Bixler, C. L. Clausen, W. C. Norman, M. H. Wynn; *Lecturer:* B. W. Stevens

PRTM 101 Concepts of Leisure 3(3,0) Introduces recreation professions and organizations: government, voluntary, and commercial. Overviews professional preparation. Outlines development of man's uses of leisure and evolution of recreation, city parks, natural resources conservation, and preservation movements as philosophical forces affecting leisure services.

PRTM 104 Recreation Services Delivery Systems 3(3,0) Students are introduced to the major delivery systems of Parks, Recreation, and Tourism Management. The philosophy, clientele, current issues, and career opportunities within these areas are studied. Enrollment limited to Parks, Recreation, and Tourism Management majors.

PRTM 201, H201 The Recreation/Leisure Environment 3(3,0) Discusses the development characteristics of built and natural environmental resource settings for recreation, tourism development, and community expression. Examines human/environment interactions during leisure, including both impacts of the recreation environment on people and people impacts on the recreation environment. Surveys public agencies and private interests in these settings.

PRTM 203 Personal and Community Health 3(3,0) Deals with health problems, disease prevention and control, school health practices, public health administration, and other health information which may enable one to live intelligently in today's complex society.

PRTM 205 Program and Event Planning 3(2,3) Principles and methods of program development. Time and facility utilization for sports activities, social functions, arts and crafts, outdoor activities, hobbies or special-interest groups, and activities in the cultural and performing arts are pursued. *Preq:* PRTM 101.

PRTM 206 Practicum I 1(0,3) Provides the opportunity for students to conduct a recreation program in a supervised setting. A minimum of 90 hours with a leisure agency approved by the University is required. To be taken Pass/Fail only. *Preq:* PRTM 205, Sophomore standing in Parks, Recreation, and Tourism Management.

PRTM 207 Practicum II 1(0,3) Continuation of PRTM 206. Experience in a leisure situation different from the PRTM 206 exposure. A minimum of 90 hours with a leisure agency and approved by the University is required. To be taken Pass/Fail only. *Preq:* PRTM 205, Sophomore standing in Parks, Recreation, and Tourism Management.

PRTM (FOR) 209 Professional Application of Microcomputers 3(1,4) [C.3] Basic competencies in and professional applications of the following areas are realized: GUI, word processing, databases, spreadsheets, graphics and electronic communication. Additionally, legal and ethical issues of computer use and information access and exchange are presented. *Preq:* Majors in Parks, Recreation, and Tourism Management or Forest Resources will be given registration priority.

PRTM 254 Introduction to Sport Management 3(3,0) Development of a conceptual understanding of sport management, career opportunities in sport management, and the necessary competencies for the different career fields.

PRTM 270, H270 Introduction to Recreation Resources Management 3(3,0) Fundamentals of recreation resources management are presented to include the framework of management, management of specific resources, management of visitors, and management of services.

PRTM 301 Recreation and Society 3(3,0) Role of recreation in a technological and work-oriented society is investigated. Particular emphasis is on recreation behavior, resources, and programming in public and private organizations which serve the public wants. Not open to Parks, Recreation, and Tourism Management majors or students who are taking or have completed PRTM 101.

PRTM 305 Safety and Risk Management in Parks, Recreation, and Tourism Management 3(3,0) Provisions of safe services, facilities, and activities in the parks, recreation, and tourism domain are studied through the application of germane concepts from the areas of safety, risk management, and liability. *Preq:* PRTM 321. *Coreq:* Junior standing.

PRTM 307 Facility Operations and Maintenance 3(2,3) Maintenance techniques and materials. Job planning and scheduling problems of overuse and preventive maintenance are included.

PRTM 308, H308 Leadership and Group Processes in Recreation 3(3,0) Leadership is analyzed through experience-based learning. Various styles of leadership and communication and their probable consequences are examined. Techniques for planning of large and small group meetings are considered. Examination is made of literature in the field of leadership and group processes.

PRTM 309 Behavioral Concepts in Parks, Recreation, and Tourism 3(3,0) Studies social psychological concepts concerning leisure behavior in various types of park, recreation, and tourism settings. Students learn to apply those theories and behavioral concepts required to understand and manage leisure activities and environments. *Preq:* PRTM 101 or consent of instructor; SOC 201 or PSYCH 201.

PRTM 311, H311 Therapeutic Recreation 3(3,0) Examination of the profession of therapeutic recreation by analyzing the history, philosophy, concepts, roles, and functions involved in the therapeutic recreation services.

PRTM 314 Therapeutic Recreation Interventions I 1(0,3) Experiential examination of program interventions used with mental health, chemically dependent, and related populations. *Preq:* PRTM 101.

PRTM 315 Therapeutic Recreation Interventions II 1(0,3) Experiential examination of program interventions used with physically disabled and other populations. *Preq:* PRTM 314.

PRTM 316 Therapeutic Recreation Processes 3(3,0) Examination of principles and procedures applicable to client assessment, activity analysis, goal identification, treatment planning, documentation, and evaluation in therapeutic recreation. *Preq:* PRTM 311.

PRTM 318 Leisure Lifestyle Management 3(3,0) Examines principles and techniques applicable to guiding disabled as well as nondisabled individuals in an exploration of leisure needs, barriers, consequences, and accessibility.

PRTM 320, H320 Recreation Policymaking 3(3,0) Structures and processes for public park and/or recreation policy formation in the United States.

PRTM 321, H321 Recreation Administration 3(3,0) Analysis of the internal organization of a recreation department dealing with finances and accounting, records and reports, publicity and public relations, state and federal legislation, staff organization, coordination of community resources. *Preq:* Junior standing.

PRTM 330, H330 Visitor Services and Interpretation 3(3,0) Introduction to the philosophy and principles of the art of environmental interpretation. A comprehensive survey of interpretive theory as it applies to the recreation and parks practitioner and the varying settings within the profession.

PRTM 342, H342 Introduction to Tourism 3(3,0) Survey of travel and tourism in the United States with focus on terminology, demographics, financial significance, and trends.

PRTM 343 Spatial Aspects of Tourist Behavior 3(3,0) Spatial patterns of national and international leisure travel destinations are explored and analyzed regarding their tourism attractiveness.

PRTM 344 Tourism Markets and Supply 3(3,0) Acquaints students with the principles of matching tourism markets and supply. Students examine the strategies used in developing markets.

PRTM 349 Survey of Tourism Sites 1(0,3) On-site study of various exemplary components of the travel and tourism industry in the Southeast. There are additional costs to students to cover the travel portion of this course. To be taken Pass/Fail only. *Preq:* PRTM 342; Junior standing in Parks, Recreation, and Tourism Management or consent of instructor.

PRTM 352 Camp Organization and Administration 3(2,3) Surveys the development and trends of camping in America. Considers programming for the operations of agency and private camps. Enables students to master the techniques of group living. Laboratory offers practical experience in camp craft including trips and outdoor cooking.

PRTM 390 Independent Study in Parks, Recreation, and Tourism Management 1-3(1-3,0) Comprehensive studies and investigation of special topics not covered in other courses. Emphasis is on field studies, community service, and independent readings. May be repeated for a maximum of three credits. *Preq:* Junior standing and consent of instructor.

PRTM 391 Selected Topics in Parks, Recreation, and Tourism Management 2-3(2-3,0) In-depth examination of developing trends in parks, recreation, and tourism that warrant timely study. May be repeated twice for a maximum of six credits, but only if different topics are covered. *Preq:* Junior standing in Parks, Recreation, and Tourism Management.

PRTM 400, 600 Supervision of Recreation Personnel Patterns and Processes 3(3,0) Comprehensive study of the supervisory process in relation to individuals, programs, and groups in recreation agencies.

PRTM 403 Elements of Recreation and Park Planning 3(3,0) Basic recreation and park planning principles, processes, and trends in area and facility development combine to form the basis for formulation of a relevant knowledge of planning. *Preq:* Senior standing.

PRTM 404 Field Training I 1(1,0) Preparation for field training experience including topics such as résumé development, interviewing techniques, internship agency selections, and responsibilities of the student, department, and agency. To be taken Pass/Fail only. *Preq:* PRTM 206, 207 (or concurrent enrollment), or consent of instructor.

PRTM 405 Field Training II 7(0,21) Minimum of ten weeks (at least 400 hours) of uninterrupted, supervised work within a park, recreation, or tourism management agency. Under agency staff supervision, students observe, organize, and implement activities, events, and programs. To be taken Pass/Fail only. *Preq:* PRTM 206, 207, 404; Senior standing in Parks, Recreation, and Tourism Management; grade-point ratio equivalent to Clemson University graduation requirement; consent of instructor.

PRTM 406 Senior Seminar 1(1,0) Examination of current community recreation, resource management, therapeutic recreation, and tourism management topics that allows senior Parks, Rec-

recreation, and Tourism Management students the opportunity to relate their academic studies to the latest problems, changes, and trends in the field. *Preq:* Senior standing in Parks, Recreation, and Tourism Management.

PRTM 409 Methods of Recreation Research I 3(3,0) Analysis of the principle methods of recreation research, the application of descriptive statistics to recreation research, and the development of a research proposal. *Preq:* Senior standing.

PRTM 410, H410 Methods of Recreation Research II 3(3,0) Continuation of PRTM 409; includes supervised execution and reporting of results of the research proposal developed in PRTM 409 and the application of inferential statistics to research. *Preq:* PRTM 409 or consent of instructor.

PRTM 411, H411, 611 Therapeutic Recreation for Selected Populations 3(2,3) Therapeutic recreation services for the developmentally disabled person and youth and adult corrections populations. Emphasis is directed to the planning and implementation of therapeutic recreation services to the needs of clients and the goals of agencies and institutions.

PRTM 412, H412, 612 Therapeutic Recreation and Mental Health 3(3,0) Therapeutic recreation services in mental health clinics, institutions, and outdoor settings. Review of disorders and current modes of treatment as they relate to therapeutic recreation. *Preq:* PRTM 311 or consent of instructor.

PRTM 413, 613 Recreation Therapy in Physical Rehabilitation 3(3,0) Examination of the potential psychological, physical, and sociological implications of disability to the individual and to the planning and directing of therapeutic recreation services. *Preq:* PRTM 311 and three credit hours of human anatomy and physiology or consent of instructor.

PRTM (ED SP) 414, 614 Recreation and Leisure for Special Populations 3(3,0) Provides class participants with practical experience in designing recreation and leisure activities for special populations (e.g., handicapped, elderly).

PRTM (ED F) 415, 615 Methods in Reducing Risks for Middle Childhood 3(2,3) See EDF415.

PRTM 416 Leisure and Aging 3(3,0) Examines the role of leisure services in later life, the needs of community-based and institutionalized elderly, and the development of service-delivery systems to meet those needs.

PRTM 421, H421, 621 Recreation Financial Resources Management 3(3,0) Analysis of recreation financial resources management. Deals with revenue sources and their allocation. *Preq:* PRTM 321 and Senior standing in Parks, Recreation, and Tourism Management.

PRTM (GEOG) 430, 630 World Geography of Parks and Equivalent Reserves 3(3,0) Major international patterns in the provision and use of urban and rural parks and recreation are examined.

PRTM 431, 631 Methods of Environmental Interpretation 3(2,3) Practice and instruction in the use of equipment and methods available to the interpreter in public contact work. Coaching in presentation and evaluation of live programs

and in design, execution, and evaluation of mediated programs is the major emphasis. Programs are delivered to public audiences in the Clemson area. *Preq:* PRTM 330; Senior standing in Parks, Recreation, and Tourism Management; or consent of instructor.

PRTM 441, 641 Commercial Recreation 3(3,0) Components of offering leisure services and products to the public by individuals, partnerships, and corporations for the purpose of making a profit.

PRTM 443, 643 Resorts in National and International Tourism 3(3,0) A variety of resort types are studied with respect to their development, organization, visitor characteristics, and environmental consequences. A case-study approach is used.

PRTM 444, 644 Tour Planning and Operations 3(3,0) Provides the opportunity to understand the psychology of touring, with emphasis on packaged and group tours and how tours of different types and scale are planned, organized, marketed, and operated. *Preq:* PRTM 342 or consent of instructor.

PRTM 445, 645 Conference/Convention Planning and Management 3(3,0) Provides the opportunity to understand the problems of and solutions to conference and convention planning and management from both the sponsoring organization and facility manager's perspectives.

PRTM 446, 646 Community Tourism Development 3(3,0) Provides a community-based perspective of the organizational, planning, development, and operational needs for a successful tourism economy at the local level. *Preq:* PRTM 342 or consent of instructor.

PRTM 447, 647 Perspectives on International Travel 3(3,0) Using the United States as a destination, international travel patterns and major attractions are presented. Factors which restrain foreign travel to the United States are analyzed.

PRTM 452, 652 Campus Recreation 3(3,0) Study of the basic components required for administration of successful college union and intramural-recreation sport programs.

PRTM 453 Sports Information and Event Management 3(3,0) Introduction to basic techniques, tools, and procedures associated with sports information and event management activities. Focuses on the application of sports information and event management activities building upon knowledge from personal interviews, selected readings, event management brochures and field experience. *Preq:* PRTM 254 or consent of instructor.

PRTM 454 Trends in Sport Management 3(3,0) Examination of trends in the sport management area that allows PRTM majors to obtain an updated knowledge base of the field. Students are able to relate their academic studies to the current trends, problems, and management strategies confronting and being used within the sport management industry. *Preq:* PRTM 254 or consent of instructor.

PRTM 472, 672 Historic Site Interpretation 3(3,0) Development and implementation of the specialized interpretive programs required at historic sites. An overview of the historic movement in the United States and its presentation to the American people. *Preq:* PRTM 330.

PRTM 474, H474 Advanced Recreation Resources Management 3(3,0) Advanced topics in recreation resource management focusing on management strategies and techniques for addressing common resource and social problems in recreation resource management. Case studies and problem analysis are emphasized. *Preq:* Senior standing or consent of instructor.

PRTM 490 SR Independent Study 1-3(1-3,0) In cooperation with and under supervision of a faculty member, students develop and execute a field study or community project. May be repeated twice for a maximum of three credits. *Preq:* Senior standing in Parks, Recreation, and Tourism Management or consent of instructor.

PHILOSOPHY

Professors: W. A. Maker, Chair; T. G. May, S. Silvers; *Associate Professors:* M. A. Martin, T. J. Oberdan, S. A. Sarris, D. E. Wueste; *Assistant Professor:* K. C. Smith; *Visiting Instructor:* S. J. Heikkila; *Lecturer:* J. M. Culler

PHIL 101, H101 Introduction to Philosophic Problems 3(3,0) Discussion of representative philosophical questions which arise from human thought and action. Characteristic topics are values, knowledge, human nature, and society.

PHIL 102, H102 Introduction to Logic 3(3,0) Introduction to methods of evaluating arguments. Simple valid argument forms are given which can be joined together to produce the logical form of virtually any argument. Informal fallacies may also be considered.

PHIL 103 Introduction to Ethics 3(3,0) Philosophical consideration of the nature of ethics, basic ethical issues, and problems and modes of ethical reasoning.

PHIL 303 Philosophy of Religion 3(3,0) Critical consideration of the meaning and justification of religious beliefs. Representative topics are the nature and existence of God, religious knowledge, religious language, the problem of evil.

PHIL 304 Moral Philosophy 3(3,0) Study of moral problems, their origin in conflicts between duty and desire, and alternative solutions proposed by classical and contemporary writers.

PHIL 315 Ancient Philosophy 3(3,0) Origins and development of rationality as found in the thought of selected philosophers such as Socrates, Plato, and Aristotle.

PHIL 316 Modern Philosophy 3(3,0) Development of the modern view as seen in major Western philosophers of the 16th, 17th, and 18th centuries. Thought of Descartes, Spinoza, Leibniz, Locke, Berkeley, and Hume may be considered to illustrate the development of rationalism and empiricism.

PHIL 317 Nineteenth-Century Philosophy 3(3,0) Development of 19th-century philosophy with emphasis on selected works of philosophers such as Kant, Hegel, Marx, Nietzsche, and Kierkegaard.

PHIL 318 Twentieth-Century Philosophy 3(3,0) Study of the dominant movements in Western philosophy today, particularly existentialism and analytical philosophy. The object is to acquire sufficient background for reading current philosophical or philosophically-influenced literature.

PHIL 320 Social and Political Philosophy 3(3,0)

Critical consideration of the views of some major philosophers on the nature of the individual's relation to society and the state in the context of their wider philosophical (logical, epistemological, metaphysical, and ethical) doctrines. Philosophers examined may include Plato, Aristotle, Augustine, Hobbes, Rousseau, Mill, Marx, Hegel, Rawls, and Nozick.

PHIL 323 Theory of Knowledge 3(3,0)

Examination of concepts, criteria, and decision procedures underlying rational belief and the justification of knowledge claims. Representative answers to the problem of skepticism are considered, with special attention to some leading theories of knowledge.

PHIL 324 Philosophy of Technology 3(3,0)

Examines technology and representative philosophical assessments of it with a focus on understanding its impact on the human condition.

PHIL 325 Philosophy of Science 3(3,0)

Philosophical study of problems generated by science, but which are not themselves scientific, such as what comprises a scientific theory; how scientists formulate theories and acquire knowledge; what, if anything, differentiates science from other ways of knowing; what role concepts play in scientific knowledge; and whether scientific progress is rational.

PHIL 326 Science and Values 3(3,0)

Examination of several features of the relation between science and values. Topics may include the ethical and social obligations of scientists, the role of value judgements in scientific practice, and the influence of social and political values on science and scientists.

PHIL 327 Philosophy of Social Science 3(3,0)

Inquiry into the philosophical foundations of social science, in particular questions of objectivity, explanatory structure, causality, agency, normativism and naturalism, and social determination of knowledge.

PHIL 330 Contemporary Issues in Philosophy 3(3,0)

Examination of a variety of issues of broad concern to philosophers today. Issues may vary. With departmental consent, course may be repeated once for credit.

PHIL 335 Philosophy and Film 3(3,0)

Introduction to philosophical thought about film, the study of films, and theoretical and critical writing about films. Both philosophical problems about the nature of film and philosophical problems exhibited in films are considered.

PHIL 343 Philosophy of Law 3(3,0)

Explanation of the nature of legal theory and the law through a critical examination of the basic concepts and principles of these fields.

PHIL 344 Business Ethics 3(3,0)

Study of ethical issues created by business activities, relating them to fundamental questions of ethics generally. Representative topics may include hiring, firing, promotions, business and minorities, organizational influence in private lives, consumer interests, economic justice, and reindustrialization.

PHIL 345 Environmental Ethics 3(3,0)

Study of ethical problems in our dealings with the rest of nature and of how they relate to ethics in general. Representative topics include the basis of

ethics, nature and intrinsic value, duties to future generations, economics and the environment, rare species, animal rights, ethics and agriculture, energy doctrine.

PHIL 347 Ethics in Architecture 3(3,0)

Interdisciplinary course focused on the architectural profession and the practices of design, building, and other processes in a social and business context. Consideration is given to both general moral principles and particular case studies.

PHIL (NURS) 350 Technology and Philosophy in Nursing 3(3,0)

See NURS 350.

PHIL 355 Philosophy of Mind and Cognitive Science 3(3,0)

Critical examination of philosophical and scientific theories of mental phenomena and of the relationship between mental and material phenomena. Theories of Mind-Body Dualism, Monism, Functionalism, Eliminative and Reductive Materialism, Connectionism, and the status of folk psychology versus cognitive neuroscience are studied.

PHIL 360 Symbolic Logic 3(3,0)

Introduction to the basic concepts of modern symbolic logic, including the symbolization of statements and arguments and the techniques of formal proof.

PHIL 401, 601 Studies in the History of Philosophy 3(3,0)¹

In-depth study of a selected philosopher, philosophical school, or movement. Topics vary. With departmental consent, course may be repeated once for credit. *Preq:* Consent of instructor.

PHIL 402, 602 Topics in Philosophy 3(3,0)¹

Thorough examination of a particular philosophical topic, issue, or problem. Topics vary. With departmental consent, course may be repeated once for credit. *Preq:* Consent of instructor.

PHIL 499 Independent Study 1-3(1-3,0)

Course of study designed by the student in consultation with a faculty member who agrees to provide guidance, discussion, and evaluation of the project. Student must confer with the faculty member prior to registration. May be repeated for a maximum of six credits. *Preq:* Consent of instructor.

¹Current topics and course descriptions available in the department's course offering brochure.

PHYSICAL SCIENCE**PH SC 107 Introduction to Earth Science 4(3,3)**

Survey of topics in geology, meteorology, astronomy, and oceanography emphasizing comprehension and practical application of earth science concepts to experiments and activities appropriate for the elementary school classroom. Enrollment priority is given to Early Childhood and Elementary Education majors.

PH SC 108 Introduction to Physical Science 4(3,3)

Survey of topics in chemistry and physics emphasizing comprehension and practical application of physical science concepts to experiments and activities appropriate for the elementary school classroom. Enrollment priority is given to Early Childhood and Elementary Education majors.

PH SC 301 Integrated Mathematics and Science 3(3,0)

Modern concepts in mathematics and sciences are applied to current issues, paying special attention to the interconnectedness of scientific

advances and economic and ethical issues. Presented through hands-on, inquiry-based activities, course prepares pre-service teachers to teach in the middle grades. *Preq:* General education mathematics and science requirements.

PHYSICS

Professors: P. B. Burt, D. D. Clayton, M. S. Daw, L. L. Larcom, M. F. Larsen, P. J. McNulty, Chair; J. R. Manson, J. W. Meriwether, J. R. Ray, G. X. Tessema, R. C. Turner, *Associate Professors:* T. F. Collins, P. J. Flower, D. H. Hartmann, D. L. Hysell, M. D. Leising, B. S. Meyer, *Assistant Professors:* D. L. Carroll, J. A. Clayhold, H. Jiang, J. P. McCarten, T. M. Tritt; *Lecturers:* D. D. Moyle, J. L. Reid

PHYS 101 Current Topics in Modern Physics 1(0,2)

Demonstrations and lectures serving as an introduction to different areas of physics and astronomy are presented by various members of the staff. May include such topics as astrophysics, energy, relativity, and weather, as well as visits to the planetarium.

PHYS 122, H122 Physics with Calculus 13(3,0)¹

First of three courses in a calculus-based physics sequence. Topics include vectors, laws of motion, conservation principles, rotational motion, oscillations, and gravitation. *Coreq:* MTHSC 108.

PHYS 124 Physics Laboratory I 1(0,3)

Introduction to physical experimentation with emphasis on mechanical systems, including oscillatory motion and resonance. Computers are used in the experimental measurements and in the statistical treatment of data. *Coreq:* PHYS 122.

PHYS 200 Introductory Physics 4(3,2)¹

Introduction to classical physics. Includes elements of mechanics, heat, electricity, and light. May not be substituted for PHYS 122 but may be substituted for PHYS 207, only with the approval of the Department of Physics and Astronomy. *Coreq:* MTHSC 105 or equivalent.

PHYS 207 General Physics I 4(3,2)¹

Introductory course for students who are not majoring in physical science or engineering. Covers such topics as mechanics, waves, fluids, and heat. *Coreq:* Course that includes algebra and trigonometry.

PHYS 208 General Physics II 4(3,2)²

Continuation of PHYS 207. Covers such topics as electricity, magnetism, electromagnetic waves, optics, and modern physics. *Preq:* PHYS 207.

PHYS 221, H221 Physics with Calculus II 3(3,0)²

Continuation of PHYS 122. Topics include thermodynamics, kinetic theory of gases, electric and magnetic fields, electric currents and circuits, and motions of charged particles in fields. *Preq:* PHYS 122.

PHYS 222, H222 Physics with Calculus III 3(3,0)

Continuation of PHYS 221. Topics include wave motion, electromagnetic waves, interference and diffraction, relativity, atomic particles, and atomic and nuclear structure. *Preq:* PHYS 221.

PHYS 223 Physics Laboratory II 1(0,3)

Experiments in heat and thermodynamics, electrostatics, circuits, and magnetism. Computers are used in the statistical treatment of data. *Coreq:* PHYS 221.

PHYS 224 Physics Laboratory III 1(0,3) Experiments involve atomic, molecular, and nuclear systems. Wave particle dualism of light and matter is emphasized. Calculators and computers are used in statistical treatment of data. *Coreq:* PHYS 222.

PHYS 240 Physics of the Weather 3(3,0) Descriptive introduction to meteorology. Includes atmospheric thermodynamics, solar radiation, heat budget, atmospheric circulation, force laws governing air motion, fronts, precipitation, synoptic prediction. Special topics of current interest such as the effect of environmental pollution on weather and the effect of weather on health are included.

PHYS 262 Physics of Music 3(3,0) Elementary, nontechnical study of the relationship between the laws of physics and the production of music for the music student or layman who wishes to understand the physical principles of the art. Topics include mechanical and acoustical laws, harmonic analysis, musical scales, sound production in instruments, physiology of hearing, etc.

PHYS 290 Physics Research 1-3(0,3-9) Individual research project performed in any area of experimental or theoretical physics or astronomy. Work is performed under the supervision of a physics or astronomy faculty member. Project need not be original but must add to the student's ability to carry out research. May be repeated for a maximum of six credits. *Preq:* Consent of instructor and minimum grade-point ratio of 3.0.

PHYS 300, H300 Introduction to Research 1(2,0) Acquaint students with current research in physics. Seminars are provided where research activities in various areas of physics and astronomy are summarized. Provides a basis for students to choose a suitable topic for a senior thesis. *Preq:* Junior standing in physics.

PHYS 311 Introduction to the Methods of Theoretical Physics 3(3,0) Survey of the methods and techniques of problem-solving in physics. Emphasizes the application of mathematical techniques to the solution of problems of vectors, fields, and waves in mechanics, electromagnetism, and quantum physics. *Preq:* PHYS 222 or consent of instructor.

PHYS 321, H321, 621 Mechanics I 3(3,0) Statics, motions of particles and rigid bodies, vibratory motion, gravitation, properties of matter, flow of fluids. *Preq:* PHYS 221.

PHYS 322, H322, 622 Mechanics II 3(3,0) Dynamics of particles and rigid bodies, Lagrangian and Hamiltonian formulations, vibrations of strings, wave propagation. *Preq:* PHYS 321 or consent of instructor.

PHYS 325, H325, 625 Experimental Physics I 3(1,4) Introduction to experimental modern physics, measurement of fundamental constants, repetition of crucial experiments of modern physics (Stern-Gerlach, Zeeman effect, photoelectric effect, etc.). *Coreq:* PHYS 321 or consent of instructor.

PHYS 326, H326, 626 Experimental Physics II 3(1,4) Continuation of PHYS 325.

PHYS 355, H355 Modern Physics 3(3,0) Study of the topics of modern physics, including relativity, atomic physics, quantum mechanics, condensed-matter physics, nuclear physics, and el-

ementary particles. *Preq:* PHYS 222, MTHSC 206, or consent of instructor.

PHYS 401, H401 Senior Thesis (1-3) Semi-original theoretical, experimental, or computational research project performed under the direction of a faculty member. Fields available include astronomy, astrophysics, atmospheric physics, biophysics, high energy physics, relativity, solid state physics, and statistical mechanics. May be repeated for a maximum of six credits. *Preq:* Nine credits of physics at the 300/400 level.

PHYS 417, H417, 617 Introduction to Biophysics 13(3,0) Introduction to the application of physics to biological problems. Topics include a review of elementary chemical and biological principles, physics of biological molecules, and fundamentals of radiation biophysics. *Preq:* MTHSC 206, PHYS 221, or consent of instructor.

PHYS 420, 620 Atmospheric Physics 3(3,0) Study of physical processes governing atmospheric phenomena. Topics include thermodynamics of dry and moist air, solar and terrestrial radiative processes, convection and cloud physics, precipitation processes, hydrodynamic equations of motion and large-scale motion of the atmosphere, numerical weather prediction, atmospheric electricity. *Preq:* MTHSC 108, PHYS 208 or 221.

PHYS 432, H432, 632 Optics 3(3,0) Covers a selection of topics, depending on the interest of the student. Topics may include the formation of images by lenses and mirrors, design of optical instruments, electromagnetic wave propagation, interference, diffraction, optical activity, lasers, and holography. *Preq:* PHYS 221.

PHYS 441, H441, 641 Electromagnetics I 3(3,0) Study of the foundations of electromagnetic theory. Topics include electric fields, electric potential, dielectrics, electric circuits, solution of electrostatic boundary-value problems, magnetic fields, and magnetostatics. *Preq:* PHYS 221 and MTHSC 208, or consent of instructor.

PHYS 442, H442, 642 Electromagnetics II 3(3,0) Continuation of PHYS 441. Study of the foundations of electromagnetic theory. Topics include magnetic properties of matter, microscopic theory of magnetization, electromagnetic induction, magnetic energy, AC circuits, Maxwell's equations, and propagation of electromagnetic waves. Other topics may include waves in bounded media, antennas, electrodynamics, special theory of relativity, and plasma physics. *Preq:* PHYS 441 or consent of instructor.

PHYS 446, H446, 646 Solid State Physics 3(3,0) Introductory treatment of the crystal structure of solids and the properties of solids which depend on crystal structure, free electron model of metals, band theory of solids, Brillouin zones, crystalline defects, and diffusion. *Preq:* PHYS 222 or consent of instructor.

PHYS 452, H452, 652 Nuclear and Particle Physics 3(3,0) Study of our present knowledge concerning subatomic matter. Experimental results are stressed. Topics include particle spectra, detection techniques, Regge pole analysis, quark models, proton structure, nuclear structure, scattering and reactions.

PHYS 455, H455, 655 Quantum Physics I 3(3,0) Discussion of solution of the Schrodinger equation for free particles, the hydrogen atom, and the harmonic oscillator. *Preq:* PHYS 322 and 441, or consent of instructor.

PHYS 456, H456, 656 Quantum Physics II 3(3,0) Continuation of PHYS 455. Application of principles of quantum mechanics as developed in PHYS 455 to atomic, molecular, solid state, and nuclear systems. *Preq:* PHYS 455.

PHYS 465, H465, 665 Thermodynamics and Statistical Mechanics 3(3,0) Study of temperature development of the laws of thermodynamics and their application to thermodynamic systems. Introduction to low temperature physics is given. *Preq:* Six hours of physics beyond PHYS 222 or consent of instructor.

PHYS 475, 675 Selected Topics 1-3(0-3,0-9) Comprehensive study of a topic of current interest in the field of physics. May be taken for a maximum of six credits, but only if different topics are covered. *Preq:* Consent of instructor.

¹Credit for a degree will be given for only one of the following: PHYS122, 200, 207.

²Credit for a degree will be given for only one of the following: PHYS 208, 221.

PLANNING STUDIES

Professors: J. B. London, B. C. Nocks; *Associate Professor:* K. R. Brooks; *Assistant Professors:* M. G. Cunningham, J. T. Farris; *Lecturer:* R. W. Bainbridge

C R P 405, 605 Urban Genesis and Form 3(3,0) Familiarizes professional students in the environmental design disciplines with the origin, development, and growth of cities to enable them to understand the ever accelerating growth of urbanism and increasing complexity of urban organism. *Preq:* Consent of instructor or department chair.

C R P 411, 611 Introduction to City and Regional Planning 3(3,0) Introduces students from a variety of disciplines to City and Regional Planning. Spatial and nonspatial areas of discipline are explored through a wide ranging lecture/seminar program. *Preq:* Consent of instructor or department chair.

C R P 415 Small City and Rural Planning 3(3,0) Examines current and future aspects and challenges of small urban centers and rural areas. May focus on a wide range of subjects—design, economic, social, political, physical, natural resources, and environmental—depending on the emphasis at the time.

C R P 440 Computer-Aided Design and Presentation 3(2,4) Provides students with an opportunity to learn and apply effective computer techniques and skills needed to design project presentations using a variety of computer programs. Each student will apply these programs and techniques to design and develop his/her own project for presentation. *Preq:* Consent of instructor.

C R P 472, 672 Planning Process and Administration 3(3,0) Course outlines a conceptual framework of planning organizations and tools used in the planning process; potentials of planning and management approaches that address the relationship and integration between techniques and instruments. *Preq:* Consent of instructor.

CR P 474, 674 Real Estate "Master Builder" Development Process 3(3,0) Study of the real estate and land development process from the developer's perspective. Cases and lectures are presented by leading experts in the development industry. Emphasizes who the participants are on the development team and how to become a developer/"master builder" in order to create a superior built environment. *Preq:* Consent of the instructor.

CR P 483, 683 Planning Communication 3(3,0) [W.2] In-depth analysis of methods to effectively communicate planning and policy decisions and attempts to familiarize students with the various communication skills needed by planners, policy-makers, and other professionals to become successful practitioners. *Preq:* Consent of instructor or department chair.

PLANT PATHOLOGY

Professors: N. D. Camper, S. A. Lewis, *Chair*; S. W. Scott; *Associate Professors:* R. A. Dean, D. A. Kluepfel, M. B. Riley, *Research Associate*; *Assistant Professor:* S. N. Jeffers

PL PA 302, H302 Plant Pathology Research 1-3(3,0-9) Research experience in a plant pathology project for undergraduates who understand basic concepts of research. Students develop research objectives, procedures, and collect data. A written report includes interpretation of results. To be taken Pass/Fail only. *Preq:* Consent of instructor.

PL PA 401, H401, 601 Plant Pathology 3(2,2) Interrelationships between fungi, nematodes, bacteria, viruses, and mycoplasmas as causal agents of plant diseases, their hosts, and the environment. Diseases caused by abiotic factors, symptom development, diagnosis, economics, control, and relationship of plant diseases to human welfare are studied using examples of economically important diseases. *Preq:* BIOL 103, 104 or equivalents.

PL PA 402, H402, 602 Diseases of Ornamental Plants 3(2,2)S Odd-numbered years. Survival mechanisms, life cycles, host-parasite relationships, symptomatology, diagnosis, economics, and integrated control of infectious diseases; and causal factors, diagnosis and control strategies of noninfectious diseases of ornamental plants. *Preq:* PL PA 401 or equivalent.

PL PA (ENT) 406, H406, 606 Diseases and Insects of Turfgrasses 3(2,2)F Host-parasite relationships, symptomatology, diagnosis, economics, and control of infectious and noninfectious diseases of turfgrasses; life histories, diagnosis, and control of important insect pests of turfgrasses. *Preq:* ENT 301 and PL PA 401 or equivalents.

PL PA 411, 611 Plant Disease Diagnosis 1 2(1,2)SS Methods and procedures used in the diagnosis of plant diseases, especially late spring and early summer diseases. Basic techniques of pure culture and identification of plant pathogens and Koch's postulates are taught. Diagnosis of a wide variety of diseases of cultivated and wild plants is carried out. *Preq:* PL PA 401 or equivalent.

PL PA 451, 651 Bacterial Plant Pathogens 3(2,3)F Odd-numbered years. The nature, development, and control of plant diseases caused by bacteria. Taxonomic considerations, host-parasite relations and techniques used in isolating, identifying, and

preserving bacterial plant pathogens. *Preq:* MICRO 305, PL PA 401, or consent of instructor.

PL PA 456, 656 Plant Virology 3(2,3)S Even-numbered years. Plant viruses with emphasis on their morphology, biochemistry, purification and transmission; symptoms resulting from virus infection; virus-vector relationships; and serological procedures. The importance and control of plant virus diseases are discussed. *Preq:* BIOL 103 and any biochemistry or plant physiology course.

PL PA 458, H458, 658 Plant Parasitic Nematodes 3(2,3)F Even-numbered years. Morphology and taxonomy of stylet-bearing nematodes and their relationship with plant diseases. *Preq:* BIOL 103, 104 or 110, 111.

PLANT PHYSIOLOGY

PL PH 320 Plant Medicine and Magic 3(3,0) Study of the use of compounds of plant and fungal origin as poisons, hallucinogens, and pharmaceuticals. *Preq:* BIOL 104, CH 102, or permission of instructor.

POLITICAL SCIENCE

Professors: W. Lasser, M. A. Morris, M. W. Slann, *Chair*; S. H. Wainwright, J. D. Woodard; *Associate Professors:* J. M. Kelly, B. W. Ransom; *Assistant Professors:* J. C. Granville, L. R. Olson, D. Swindell; *Visiting Instructors:* J. A. Hetherington, V. Matic, N. Poser

PO SC 101, H101 Introduction to American Politics 3(3,0) Introduction to American National Government and politics with an emphasis on the functions of governmental organizations, the behavior of political parties and personalities, and the role of public opinion.

PO SC 102, H102 Introduction to Global Issues 3(3,0) Introduction to international politics, with an emphasis on a survey of the politics of the major world regions; America's role in world affairs; and selected current international issues and problems.

PO SC 104 Introduction to Comparative Politics 3(3,0) Introduction to the study of comparative politics in the post-Cold War era, with emphasis on theories and applications. Topics include democratic and nondemocratic systems; ideology; political culture; party systems; and legislative, executive, and judicial structures.

PO SC 250 Introduction to Political Science 3(3,0) Introduction to the study of political science, including an examination of key concepts in the discipline, methods and approaches to research in the various subfields, and skills and techniques of importance to the political science student. *Preq:* Sophomore standing.

PO SC 302 State and Local Government 3(3,0) The structural features, functions, and legislative, executive, and judicial processes of American state and local government.

PO SC 310 Special Activities 1-3(1-3,0) Encompasses special projects, approved by the department chair, which involve students in research, simulation, internships, or other actions requiring the study and application of political principles, and which are engaged in for at least one semester or its equivalent. *Note:* No more than

six hours credit from PO SC 310, 311, and 312 may be counted toward any degree. *Preq:* Consent of instructor.

PO SC 311 Model United Nations 1(0,1) Participation in United Nations simulation exercises, in competition with other colleges and universities. *Note:* No more than six hours credit from PO SC 310, 311, and 312 may be counted toward any degree. *Preq:* Consent of instructor.

PO SC 312 State Student Legislature 1(0,1) Participation in state student legislature simulation exercises, in competition with other colleges and universities in the State. *Note:* No more than six hours credit from PO SC 310, 311, and 312 may be counted toward any degree. *Preq:* Consent of instructor.

PO SC 321 General Public Administration 3(3,0) Introduction to public administration including the elements of organization, personnel and financial management, administrative law, and administrative responsibility. *Preq:* PO SC 101, Junior standing, or consent of instructor.

PO SC 341 Quantitative Methods in Political Science 3(3,1) Introduction to quantitative research methods in political science. Topics include research design, measurement, data collection, sampling, procedures, and applications of statistical techniques to research problems in political science. Laboratory stresses computer use for elementary data analysis.

PO SC 343 The Mass Media in American Politics 3(3,0) Role and impact of the mass media in the American political system, with emphasis on the media's role in shaping public opinion and in influencing government and public policy. *Preq:* PO SC 101, Junior standing, or consent of instructor.

PO SC 361, H361 International Politics in Crisis 3(3,0) Factors contributing to the prevalence of tension and violence in the contemporary global arena are identified and analyzed, with particular emphasis on political, economic, and military roots and manifestations of conflict. *Preq:* PO SC 102, Junior standing, or consent of instructor.

PO SC 362, 662 International Law and Organizations 3(3,0) Survey of obstacles to and advances in law and order in international relations. *Preq:* PO SC 102, Junior standing, or consent of instructor.

PO SC 363 United States Foreign Policy 3(3,0) American foreign policy in historical perspective, with particular emphasis on the decision-making process, contemporary American capabilities and challenges, and analysis of key issues.

PO SC 367 Political Risk Assessment 3(3,0) Risks associated with conducting business and other activities in different countries, especially in the frequently unstable setting of the developing world. Major commercial providers of country risk assessment are identified and critiqued. *Preq:* PO SC 102, Junior standing, or consent of instructor.

PO SC 371 European Politics 3(3,0) Major emphasis on European governments and issues of importance in the European context. Current methods of comparison are studied and applied to the formal and informal functioning of European governments. *Preq:* PO SC 102, Junior standing, or consent of instructor.

- PO SC 373, H373 Third World Politics 3(3,0)** Survey of policies and problems of development of Third World states and their implications for the United States. *Preq:* POSC 102, Junior standing, or consent of instructor.
- PO SC 375, H375 European Integration 3(3,0)** Survey course analyzing increasing institutional cooperation between European countries with a focus on the European community. *Preq:* PO SC 102, Junior standing, or consent of instructor.
- PO SC 381 African American Politics 3(3,0)** Examination of African American political thought, interests and agenda setting, and dynamics of African Americans' participation in political and governmental decision making. *Preq:* PO SC 101, Junior standing, or consent of instructor.
- PO SC (SPAN) 382 Spanish Foreign Language News 1(1,0)** Weekly discussions of Spanish-language news articles in the foreign press with an emphasis on politics and on the connections among political, economic, social, and cultural trends. Emphasis on Spanish vocabulary as well as cross-cultural contrasts with the United States. May be repeated for a maximum of three credits. *Preq:* SPAN 202 or equivalent or consent of instructor.
- PO SC (FR) 383 French Foreign Language News 1(1,0)** Weekly discussions of French-language news articles in the foreign press with an emphasis on politics and the connections among political, social, economic, and cultural trends. Emphasis on French vocabulary as well as cross-cultural contrasts with the United States. May be repeated for a maximum of three credits. *Preq:* FR 202 or equivalent or consent of instructor.
- PO SC (GER) 384 German Foreign Language News 1(1,0)** Weekly discussions of German-language news articles in the foreign press. German vocabulary is emphasized as well as cross-cultural contrasts with the United States. May be repeated for a maximum of three credits. *Preq:* GER 202 or equivalent or consent of instructor.
- PO SC (SPAN) 385 Topical Issues in Spanish 1(1,0)** Spanish-language readings and discussion of various topics in international politics. Emphasis on Spanish vocabulary as well as cross-cultural contrasts with the United States. May be repeated for a maximum of three credits. *Preq:* SPAN 202 or equivalent or consent of instructor.
- PO SC (FR) 386 Topical Issues in French 1(1,0)** French-language readings and discussion of various topics in international politics. Emphasis on French vocabulary as well as cross-cultural contrasts with the United States. May be repeated for a maximum of three credits. *Preq:* FR 202 or equivalent or consent of instructor.
- PO SC (GER) 387 Topical Issues in German 1(1,0)** German-language readings and discussion of various topics in international politics. Emphasis on relevant German vocabulary as well as cross-cultural contrasts with the United States. May be repeated for a maximum of three credits. *Preq:* GER 202 or equivalent or consent of instructor.
- PO SC 389 Selected Topics 1-3(1-3,0)** Examination of a selected area of political science. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Consent of instructor.
- PO SC H395 Junior Honors Research Seminar 1(1,0)** Readings and discussion to prepare for the Junior Research Paper and the Senior Thesis. Honors status required. *Preq:* Consent of instructor.
- PO SC H396 Junior Honors Research 1(1,0)** Readings and research in conjunction with an approved political science course at the 300 or 400 level. Honors status required.
- PO SC 403 Congressional Politics 3(3,0)** Examination of the behavior and processes of decision making in the American Congress together with an analysis of the interaction among Congress and the executive and judicial branches of the national government. *Preq:* PO SC 101, Junior standing, or consent of instructor.
- PO SC 405 Presidential Leadership 3(3,0)** Examination of the organizational patterns, administrative behavior, and political forces in the Presidency with considerable emphasis on relations between the Presidency and Congress, courts, and administrative regulatory agencies. *Preq:* PO SC 101, Junior standing, or consent of instructor.
- PO SC 407 Religion and American Politics 3(3,0)** Examination of the impact of religion on American politics, including an analysis of the role of religion in politics, political behavior of major religious groups, constitutional issues and voting behavior. *Preq:* PO SC 101, Junior standing, or consent of instructor.
- PO SC 409, 609 Directed Study in American Politics 3(3,0)** Supervised reading and/or research in selected areas of American government. *Preq:* Consent of instructor.
- PO SC 416, 616 Interest Groups and Social Movements 3(3,0)** Empirical and normative examination of the origins, roles, and influence of interest groups and social movements in the United States and of the relationships among interest groups, social movements, and democratic theory. *Preq:* PO SC 101, Junior standing, or consent of instructor.
- PO SC 421, 621 Public Policy Processes 3(3,0)** Introduction to public policy process, analysis, and evaluation. Topics include examination and comparison of policymaking models, policy analysis and decision-making techniques, and approaches to program evaluation. *Preq:* PO SC 101, Junior standing, or consent of instructor.
- PO SC 423, 623 Urban Politics 3(3,0)** Interaction of political, technical, and administrative processes in urban America. Special emphasis is given to the history and future of urban areas. *Preq:* PO SC 101, Junior standing, or consent of instructor.
- PO SC 424, 624 Federalism and Intergovernmental Relations 3(3,0)** Introduction to the historical, theoretical, legal, and fiscal aspects of constitutionally divided government. Federal, state, and local division of responsibility for public services is emphasized along with the emerging devolution of those responsibilities from the federal government to states and localities. *Preq:* PO SC 101, Junior standing, or consent of instructor.
- PO SC 427, 627 Public Personnel Management 3(3,0)** Government personnel systems; current trends and problems; essentials of recruitment, classification, compensation, motivation, evaluation, training, and discipline. *Preq:* PO SC 101, Junior standing, or consent of instructor.
- PO SC 428, 628 National Security Policy 3(3,0)** Study of the problems in formulating policies of national defense, examination of alternatives, consequences, and effectiveness of current techniques in nuclear weaponry, guerrilla and conventional warfare. *Preq:* PO SC 101, Junior standing, or consent of instructor.
- PO SC 432, 632 American Constitutional Law I 3(3,0)** Examination and analysis of Supreme Court decisions and other legal materials in the areas of national power, federalism, the separation of powers, and the role of the judiciary.
- PO SC 433, 633 American Constitutional Law II 3(3,0)** Examination and analysis of Supreme Court decisions and other legal materials in the areas of civil rights and civil liberties, with an emphasis on freedom of speech, freedom of religion, equal protection of the laws, and privacy rights.
- PO SC 434 Law, Courts, and Politics 3(3,0)** Introduction to the role of law, judges, and courts in the American political system, focusing on the nature of the legal system; legal methods; the role of courts in statutory construction and in the administrative process; and judicial activism and restraint. *Preq:* PO SC 101, Junior standing, or consent of instructor.
- PO SC 442, 642 Political Parties and Elections 3(3,0)** Study of the distinctive features of the American two-party system with emphasis on presidential elections. Parties are examined as formal organizations, coalitions of voters and interest groups, coordinators of nomination and election processes, and managers of policy-making institutions. *Preq:* PO SC 101, Junior standing, or consent of instructor.
- PO SC 451 Classical Political Thought 3(3,0)** Political philosophy from the pre-Socratic period to Machiavelli. *Preq:* PO SC 101, 102, Junior standing, or consent of instructor.
- PO SC 452 Modern Political Thought 3(3,0)** Early theories of the nation state in the 16th century and the major political thinkers, problems, and movements through the 20th century. *Preq:* PO SC 101, 102, Junior standing, or consent of instructor.
- PO SC 453 American Political Thought 3(3,0)** American political philosophy from the 17th century to the present with an emphasis on political and social developments since the 1770s. *Preq:* PO SC 101, Junior standing, or consent of instructor.
- PO SC 454, 654 Southern Politics 3(3,0)** Examination of the unique political environment of the American South, with emphasis on the events and social forces which have shaped politics in the region since World War II. Course material is approached from a variety of perspectives, including history, literature, social themes, and political culture.
- PO SC 457, 657 Political Terrorism 3(3,0)** Examination and analysis of the international phenomenon of terrorism in terms of origins, operations, philosophy, and objectives. *Preq:* PO SC 102, Junior standing, or consent of instructor.

PO SC 458, 658 Political Leadership 3(3,0) Comparative examination of political leaders, focusing particularly on types, methods, and consequences of leadership and on the relationship between leaders and followers. *Preq:* PO SC 101, Junior standing, or consent of instructor.

PO SC 465 Foreign Policies of the Major Powers 3(3,0) Study in the foreign policies of the leading world powers, with particular emphasis on geographic, economic, historical, and political influences. *Preq:* PO SC 102, Junior standing, or consent of instructor.

PO SC 471 Russian Politics 3(3,0) Introduction to Russian political institutions and culture since 1991 with a consideration of the Russian relationship with other member republics of the Commonwealth of Independent States. *Preq:* PO SC 102, Junior standing, or consent of instructor.

PO SC 472 Japan and East Asia: Politics, Government, and Foreign Policy 3(3,0) Survey of Japanese politics, government, economy, and foreign policy, primarily in East Asia. *Preq:* PO SC 102, Junior standing, or consent of instructor.

PO SC 476 Politics of the Middle East 3(3,0) Comparative examination of the political processes of the Middle East, emphasizing a sociocultural approach to the problems of political development. Emphasis on Iran, Iraq, Israel, Jordan, Lebanon, Syria, Turkey, and the United Arab Emirates. *Preq:* PO SC 102, Junior standing, or consent of instructor.

PO SC 477 Chinese Politics 3(3,0) Concepts and operation of the political system of contemporary China. Emphasis is on historical and cultural understanding of Chinese politics in the 20th century. *Preq:* PO SC 102, Junior standing, or consent of instructor.

PO SC 478 Latin American Politics 3(3,0) Survey of prominent trends in Latin American politics, with a focus on major countries in the region and major issues affecting the region. Relations between Latin American and the United States and other prominent countries will also be considered. *Preq:* PO SC 102, Junior standing, or consent of instructor.

PO SC 479 Directed Study in Comparative and International Politics 3(3,0) Readings and research in comparative government and society and international affairs. *Preq:* Consent of instructor.

PO SC 480, 680 Gender and Politics 3(3,0) Examination of the role of gender in politics in the United States and in other countries. Particular emphasis on the role of women in electoral politics, the impact of nationalist violence, and development policies on women's lives, and on women's rights as human rights. *Preq:* PO SC 101, 102, Junior standing, or consent of instructor.

PO SC 482 The Political Novel and the Cinema 3(3,0) Consideration of how political science is treated in political novels and cinema and how political opinions are shaped by these media. *Preq:* PO SC 101 or consent of instructor.

PO SC 489, 689 Selected Topics 1-3(1-3,0) Intensive examination of a selected area of political science. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Consent of instructor.

PO SC H490 Senior Honors Thesis Research 3(3,0) Reading and research related to the senior honors thesis.

PO SC H491 Senior Honors Thesis 3(3,0) Research and writing of the senior honors thesis.

PORTUGUESE

Professor: J. I. Suarez

PORT 101 Elementary Portuguese 4(3,1) Introductory course stressing speaking, listening, and writing. Attention is given to the sound system of Portuguese to develop basic communication skills.

PORT 102 Elementary Portuguese 4(3,1) Continuation of PORT 101. *Preq:* PORT 101 or consent of instructor.

PORT 201 Intermediate Portuguese 3(3,0) Intermediate course with more emphasis on communication skills and structure. Reading and writing practice in and outside the classroom, with special attention to idiomatic usage. Introduction to perspectives through readings and cultural activities. *Preq:* PORT 102 or consent of instructor.

PORT 202 Intermediate Portuguese 3(3,0) Continuation of PORT 201. *Preq:* PORT 201 or consent of instructor.

PSYCHOLOGY

Professors: T. R. Alley, R. L. Campbell II, P. A. Connor-Greene, E. H. Galluscio, J. A. McCubbin, Chair; D. D. Moore, J. G. Williams; *Associate Professors:* E. G. Brainerd, Jr., L. I. Park, D. J. Senn, B. R. Stephens, F. S. Switzer III, M. A. Taylor-Carter; *Assistant Professors:* M. Hallahan, C. C. Pagano, R. Perlow, C. L. S. Pury, R. A. Tyrrell; *Visiting Professor:* C. D. Tollison; *Visiting Assistant Professor:* P. R. Alley

PSYCH 201, H201 Introduction to Psychology 3(3,0) Introduction to the study of behavior. Analysis of the biological bases of behavior, learning, thinking, motivation, perception, human development, social behavior, and the application of basic principles to more complex phenomena such as education, personal adjustment, and interpersonal relations.

PSYCH 205 Research Methods and Measurement 3(3,0) Survey of research design used in psychology with emphasis on designs other than experimental design. Topics include attitude measurement, scaling techniques, field and observational research, and questionnaire construction. *Preq:* PSYCH 201.

PSYCH 210 Introductory Experimental Psychology 4(3,2) Introduction to the analysis of data from experimental and correlational research in psychology. Emphasis is placed on the applications and logical nature of statistical reasoning. Laboratory periods stress the techniques of data analysis using microcomputers. *Preq:* PSYCH 201 or consent of instructor.

PSYCH 295 Careers in Psychology 2(2,0) Presentation of career alternatives within psychology, a review of strategies for successful career decision making and planning, and information on managing a career in psychology. Not open to students who have previously taken PSYCH 101.

PSYCH 301 Applied Psychology 3(3,0) Emphasizes the application of theories and research to the solution of problems in the community and work place. The contributions of psychology to business and industrial settings, community settings, and educational settings are considered. *Preq:* PSYCH 201.

PSYCH 303 Psychology of Adjustment 3(3,0) Course in personal adjustment dealing with appropriate and inappropriate reactions to stress, frustration, and conflict. Consideration is given to practical coping skills and techniques for managing emotions, changing one's own behavior, and improving interpersonal relationships. *Preq:* PSYCH 201 or consent of instructor.

PSYCH 306 Human Sexual Behavior 3(3,0) The subject of sexual behavior is approached from the psychophysiological, behavioral, and cultural points of view. Evolutionary, historical, and cross-cultural perspectives are considered.

PSYCH 308 Women and Psychology 3(3,0) Explores the wide variety of psychological issues that concern women. Empirical research on topics such as motherhood, sex differentiation, motivation, and psychological disorders is emphasized. *Preq:* PSYCH 201.

PSYCH 310 Advanced Experimental Psychology 4(3,2) Continuation of PSYCH 210. Focus is on techniques of empirical research (experiments, quasi-experiments, survey research, etc.) that are widely used in psychology. Students design and carry out their own empirical research projects. Extensive practice in the writing of reports is included. *Preq:* PSYCH 201 and 210, or consent of instructor.

PSYCH 320 Principles of Behavior 3(3,0) Study of basic learning principles including classical conditioning, operant conditioning, and modeling. Initial emphasis is on animal studies followed by human applications and techniques. *Preq:* PSYCH 201, 210.

PSYCH 321 Principles of Behavior Laboratory 1(0,2) Application of behavior modification principles and techniques to the conditioning of the laboratory rat. Positive methods of behavior control are emphasized, such as reinforcement, shaping, and schedules of reinforcement. *Preq:* PSYCH 201 and 210. *Coreq:* PSYCH 320.

PSYCH 324 Physiological Psychology 3(3,0) Study of human neuroanatomy with emphasis on the function of the nervous and endocrine systems. Discusses the biological basis of behavior in its normal and abnormal dimensions. *Preq:* PSYCH 201 or consent of instructor.

PSYCH 325 Physiological Psychology Laboratory 1(0,3) Demonstrations and techniques of selected physiological procedures are presented to explain the principles discussed in PSYCH 324. *Coreq:* PSYCH 324.

PSYCH 330 Motivation 3(3,0) Various aspects of motivation are considered by studying physiological, emotional, and environmental influences on behavior. Orientation is empirical rather than theoretical with emphasis on pertinent research, applications, and measurement of motives. *Preq:* PSYCH 201.

PSYCH 333 Cognitive Psychology 3(3,0) Study of higher-order mental processing in humans. Topics include memory, learning of concepts, problem solving, and the psychology of language. *Preq:* PSYCH 201.

PSYCH 334 Laboratory in Cognitive Psychology 1(0,2) Selected experiments and demonstrations are conducted to reveal phenomena related to human perception, memory, reasoning, problem solving, and high-level mental processes. *Preq:* PSYCH 201 and 205 or 210 or consent of instructor. *Coreq:* PSYCH 333.

PSYCH 340, H340 Life-Span Developmental Psychology 3(3,0) Survey of current theory and research concerned with the psychological aspects of human growth and development across the entire lifespan. Major topics include developmental methods, physical maturation, cognition, socialization, personality, psycholinguistics, intelligence, learning, behavior problems, and exceptionality. *Preq:* PSYCH 201.

PSYCH 344 Psychology of Adolescence 3(3,0) Study of the psychosocial processes of adolescence. Major emphasis is on personality development, growth of thinking, social and sexual maturation, and variations in adolescence. *Preq:* PSYCH 201.

PSYCH 345 Adulthood and Aging 3(3,0) Special consideration of the major psychological processes of aging as they relate to individual behavior and adaptation. Included are the influences of aging on the body, learning and psychomotor skills, thinking and intelligence, employment and productivity, personality, and psychopathology. Opportunity for contact with institutionalized and noninstitutionalized elderly persons is provided. *Preq:* PSYCH 201.

PSYCH 352, H352 Social Psychology 3(3,0) Survey course analyzing human social behavior from the perspective of the individual as a participant in social relationships. Major emphasis is on the study of such contemporary social processes as attitude formation and change, interpersonal relations, conformity, conflict resolution, aggression and violence, social communication, and group phenomena. *Preq:* PSYCH 201.

PSYCH 355 Environmental Psychology 3(3,0) Consideration of the influences of the physical environment on human behavior. Topics include perception of and adaptation to the environment, effects of physical design on behavior, and individual reactions to environmental stressors. *Preq:* PSYCH 201 or consent of instructor.

PSYCH 364 Industrial Psychology 3(3,0) Reviews the perception of work from the pre-industrial revolution to the present. Comparative approaches to motivation, development, maintenance, and attraction of successful work behaviors are discussed. Topics include the organization's responsibilities to the community, implementing a disease- and accident-free workplace, and the effects of consumerism. *Preq:* PSYCH 201.

PSYCH 368 Organizational Psychology 3(3,0) Analysis of individual behavior for the purpose of investigating problems in organizations and increased organization effectiveness. Topics include psychological factors affecting communication, decision making, conflict, leadership, work stress, power, and organizational change. *Preq:* PSYCH 201.

PSYCH 370 Personality 3(3,0) Introduction to the area of personality theory emphasizing psychoanalytic, behavioral, and humanistic approaches. Applications of personality theories to such topics as development and adjustment are considered, and research implications are evaluated. *Preq:* PSYCH 201.

PSYCH 375 Psychology of Substance Abuse 3(3,0) Study of the psychological approaches to treatment of substance abuse. Topics include behavioral, social learning, and family-systems theories as applied to treating substance abuse. Emphasis is on empirical approaches to evaluating methods of treatment and matching clients to treatments. *Preq:* PSYCH 201.

PSYCH H390 Honors Seminar in Psychology 3(3,0) Variable topic seminar intended for Honors students from all majors. Topics are announced prior to registration for each semester. *Preq:* PSYCH 201.

PSYCH 415, 615 Systems and Theories of Psychology 3(3,0) Study of the development of psychology particularly during the past 100 years. Emphasis is on giving students a better perspective of present-day psychology. Focus is on the various approaches taken by influential psychologists and the conflicts among these approaches. *Preq:* PSYCH 201 and one 300-level psychology course or consent of instructor.

PSYCH 422, H422 Sensation and Perception 3(3,0) Study of psychophysical techniques of measurement and sensory and perceptual processes related to vision, hearing, and the other senses. *Preq:* PSYCH 201, and one 300-level psychology course or consent of instructor.

PSYCH 423 Sensation and Perception Laboratory 1(0,2) Selected experiments are conducted to demonstrate the phenomena involved in sensation and perception. *Preq:* PSYCH 205 or 210 or consent of instructor. *Coreq:* PSYCH 422.

PSYCH 426, 626 Advanced Physiological Psychology 3(3,0) Advanced studies of the biological basis of behavior with emphasis on functional neuroanatomy and endocrinology. Topics may vary. May not be repeated for credit. *Preq:* PSYCH 324 or consent of instructor.

PSYCH 435 Human Factors Psychology 3(3,0) Analyses of theoretical issues and research methods pertaining to the interaction between people and machines and human performance. Topics include information processing theory, human control systems and displays, task simulation, perceptual and motor factors limiting human performance. *Preq:* PSYCH 201, and one 300-level psychology course or consent of instructor.

PSYCH 443 Infant and Child Development 3(3,0) Cognitive, emotional, and social development from conception through childhood (up to age 12). Major theories and research findings are covered. *Preq:* PSYCH 201 and 340, or permission of instructor.

PSYCH 454 Psychology of Human Relationships 3(3,0) Research, theory, and their practical applications regarding the development, maintenance, and dissolution of human relationships. Understanding successful and unsuccessful relationships. Emphasis is on improving the indi-

vidual's ability to relate to other persons both interpersonally and professionally. *Preq:* PSYCH 201 and one 300-level psychology course.

PSYCH 457, 657 Principles and Processes of Teamwork 3(3,0) Study of individual and group processes as they apply to team performance. Theories, research, and models of team functioning are examined as are applications of principles to ad hoc, business, multidisciplinary work, and computer-supported teams. *Preq:* PSYCH 201, one 300-level PSYCH course or permission of instructor.

PSYCH 459, 659 Group Dynamics 3(3,0) Review of current theory and research on small-group processes with special emphasis given to group formation and development, group structure, the dynamic forces within a group, leadership, and group problem solving and decision making. *Preq:* PSYCH 201 and one 300-level psychology course or consent of instructor.

PSYCH 462, 662 Psychology and Culture 3(3,0) Seminar examining the cultural context in which (1) psychological theories and research are generated, and (2) psychological perspectives on human diversity. Topics include the philosophical positions influencing psychological theory and research; methodological issues in the study of diversity, historical and contemporary perspectives; and cross-cultural psychological research in selected content areas. *Preq:* PSYCH 310 or consent of instructor.

PSYCH 471 Psychological Testing 3(3,0) Introduction to the theory of psychological testing emphasizing the principles of measurement and psychometric characteristics of a good psychological test. Issues in test development, administration, and interpretation are reviewed. Educational, industrial, and clinical uses of tests are examined. *Preq:* PSYCH 201 and 210 or consent of instructor.

PSYCH 480, 680 Health Psychology 3(3,0) Study of the role of health-related behaviors in the prevention, development and/or exacerbation of health problems. Emphasis on the biopsychosocial model and its application in the assessment, treatment, and prevention of health problems. *Preq:* PSYCH 201, one 300-level psychology course or consent of instructor.

PSYCH 483, 683 Abnormal Psychology 3(3,0) Study of the physiological, psychological, and cultural factors involved in such behavioral disorders as transient situational disturbances, personality disorders, psychoneuroses, psychoses, and psychosomatic disturbances. Special emphasis is placed on the advantages and disadvantages of particular conceptual models in labeling and describing behaviors as either normal or abnormal. *Preq:* PSYCH 201 and one 300-level psychology course or consent of instructor.

PSYCH 488 Theories of Psychotherapy 3(3,0) Survey of alternative theories of psychological treatment for behavioral and emotional disorders. Various theoretical assumptions, techniques, and applications of each approach are examined and compared, and case examples are considered. *Preq:* PSYCH 370 or consent of instructor.

PSYCH 489, 689 Selected Topics 3(3,0) Seminar in current topics in psychology. Topics change from semester to semester and are announced prior to each semester's registration. May be repeated once for credit, but only if a different topic is covered. *Preq:* PSYCH 201 and one 300-level course or consent of instructor.

PSYCH H490 Senior Division Honors Research 12-4(2-4,0) Preparation and defense of a research proposal. The proposed project should be empirical, historical, or theoretical in nature. *Preq:* Junior standing and consent of department chair.

PSYCH H491 Senior Division Honors Research II 2-4(2-4,0) Completion of the proposed research project resulting in a written thesis. *Preq:* PSYCH H490.

PSYCH 493 Practicum in Clinical Psychology 3(1,5) Students are given an opportunity to apply classroom theory in solving individual and community problems through interaction with community agencies and other professional groups in the mental health area. Students have limited but well-controlled contact with actual clinical problems as they occur in the community environment. *Preq:* Consent of instructor.

PSYCH 495 Practicum in Applied Psychology 3(1,5) Students are provided practical experience in the area of applied psychology. Students usually are involved in a project designed to help solve an industrial problem through a direct application of industrial or social psychology. *Preq:* Either PSYCH 352 or 364 or 454 and consent of instructor.

PSYCH 497, H497 Directed Studies in Psychology 2-4(2-4,0) Study under the direction of a faculty member of a particular topic agreed upon by the student and faculty member and submitted to the department chair for approval. May be repeated for a maximum of six credits. *Preq:* Six credits in psychology, a course in research methods, and consent of instructor.

RELIGION

Associate Professor: N. A. Hardesty; *Assistant Professor:* S. E. Grosby

REL 101 Introduction to Religion 3(3,0) Variety of religious experience and expression in human life.

REL 102 World Religions 3(3,0) Survey of major religious traditions of the world.

REL 301 The Old Testament 3(3,0) Survey of the books of the Old Testament with special consideration given to the development of the concepts, institutions, and theology of the ancient Hebrews.

REL 302 Survey of New Testament Literature 3(3,0) Study of the books of the New Testament from the standpoint of their occasion, content, literary form, and basic theology.

REL 306 Judaism 3(3,0) Examination of the development of Judaism from Biblical to modern times.

REL 307 The Christian Tradition 3(3,0) Examination of the development of Christianity in Western civilization from the post-New Testament period to the present, stressing institutional growth and changes, theological currents, and interaction of Christianity with culture.

REL 308 Religions of the Ancient World 3(3,0) Selected religious movements in ancient Mesopotamia, Egypt, Canaan, and the Greco-Roman world with emphasis on movements outside the Judeo-Christian tradition.

REL 310 Religion in the United States 3(3,0) Development of religion in the United States from the Colonial period to the 20th century. Attention is devoted to analyzing broad currents in religious movements and religious thought which have given shape to the American pluralistic experience.

REL 311 African American Religion 3(3,0) Study of the religious milieu in the United States rooted in our African heritage. Background on African tribal religion is included, along with Christian denominations and new religions such as Nation of Islam, Rastafarianism, Voudun, Santeria, and Candomble.

REL 401, 601 Studies in Biblical Literature and Religion 3(3,0) Critical examination of a selected topic in biblical studies. Topics vary from year to year. May be repeated once for credit. *Preq:* Consent of instructor.

REL 402, 602 Studies in Religion 3(3,0) Thorough examination of a selected topic in one or more of the religious traditions of the world or of religious life in a particular region. Topic vary from year to year. May be repeated once for credit. *Preq:* Consent of instructor.

REL 499 Independent Study 1-3(1-3,0) Study of selected problems, issues, or movements in religion under the direction of a faculty member chosen by the student. Student and faculty member develop a course of study designed for the individual student and approved by the chair of the department prior to registration. *Preq:* Consent of instructor.

RURAL SOCIOLOGY

Professor: E. L. McLean

R S 301 Rural Sociology 3(3,0) Study of human social relationships as influenced by life in the open country and in small towns and villages including considerations of the rural population, rural social institutions, processes of change in agricultural technology, and community area planning and development.

R S (SOC) 303 Methods of Social Research I 4(3,3) See SOC 303.

R S (SOC) 371 Population and Society 3(3,0) See SOC 371.

R S (SOC) 401, 601 Human Ecology 3(3,0) Analysis of the interrelationships between the physical world, modifications in natural environments, human settlement patterns, and institutions that both encourage and regulate environmental modification. Emphasis is placed on conditions whereby natural resources become public policy concerns. *Preq:* Sophomore standing.

R S (SOC) 459, 659 The Community 3(3,0) Close analysis of the development of contemporary communities and their place in society. Continuing effects of industrialization, migration, and technological change on community location and structure are examined. Structural relations of

social class, status, and the associations among institutions are explored.

R S (SOC) 471, H471, 671 Demography 3(3,0) Demographic concepts, theory, and research methods for vital statistics, migration, and population distribution and projections. Collection and processing of demographic data and organization of demographic data systems. *Preq:* ANTH 201 or SOC 201 or R S 301.

R S (SOC) 495 Field Experience 3(1,8) See SOC 495.

R S (SOC) 498 Independent Study 3(1,6) See SOC 498.

RUSSIAN

Lecturer: J. Bridgwood

RUSS 101 Elementary Russian 4(3,1) Training in pronunciation, grammatical forms, and syntax with a view to giving the student the fundamentals necessary to hold simple conversations and to read simple Russian texts.

RUSS 102 Elementary Russian 4(3,1) Continuation of RUSS 101. *Preq:* RUSS 101.

RUSS 201, H201 Intermediate Russian 3(3,0) Brief review of RUSS 101 and 102 with conversation, composition, and dictation, and the beginning of more serious reading of Russian prose in short stories and plays. *Preq:* RUSS 102.

RUSS 202, H202 Intermediate Russian 3(3,0) Conversation, composition, and dictation based on readings of more difficult Russian prose than in the earlier courses. *Preq:* RUSS 201.

RUSS 305 Russian Conversation and Composition 3(3,0) Practice in spoken Russian with emphasis on vocabulary building, pronunciation, and comprehension. Written exercises to promote accuracy. *Preq:* RUSS 202 or consent of department chair.

RUSS 307 Russian Civilization 3(3,0) Introduction to significant elements of Russian civilization. Emphasis is on social, geographical, political, and artistic aspects of modern Russia. Taught in Russian. *Preq:* RUSS 202 or consent of department chair.

RUSS 398 Directed Reading 1-3(1-3,0) Directed study of selected works in Russian. May be repeated for a total of six credits. *Preq:* RUSS 202 or equivalent and consent of department chair.

SOCIOLOGY

Professors: J. M. Coggeshall, K. W. Crader, J. W. Ryan, Chair; D. A. Ward, W. M. Wentworth; *Associate Professors:* L. G. Peppers, J. P. Smith, D. K. Sturkie III, B. J. Vander Mey, M. F. White; *Assistant Professors:* J. E. Hawdon, C. A. Mobley, W. M. Patterson, L. S. Stephens

SOC 201, H201 Introduction to Sociology 3(3,0) Sociological perspective: the study of contemporary groups, organizations, and societies in terms of human social behavior, social change, social structure, and social institutions.

SOC 202 Social Problems 3(3,0) Social problems involving the family, education, health care, political and legal systems, economy, population, en-

vironment, community; and special problems associated with age, economics, racial status, and gender inequality.

SOC 235 Introduction to Leadership 3(3,0) Introduction to leadership in various organizational settings from a sociological perspective. Examines the concept of leadership, leadership traits, types of leadership, and the evolution of leadership behaviors in the nineteenth and twentieth centuries.

SOC (R S) 303, H303 Methods of Social Research I 4(3,3) Introduction to methods of social research: research design, sampling, measurement, reliability, and validity; the relationship between theory and research. Laboratory coordinated with lectures and introduces students to computer literacy through research. Required of all Sociology majors. *Preq:* CP SC 120, MTHSC 203 or 301 or EX ST 301, SOC 201.

SOC 310, H310 Marriage and Intimacy 3(3,0) Examination of mate selection, living together, marital relations, family planning, conflict resolution, divorce and remarriage, later life adjustments, and singlehood as a lifestyle in the United States. *Preq:* SOC 201 or consent of instructor.

SOC 311 The Family 3(3,0) Introduces students to the family as a social institution. Primary focus is on families in the United States. Topics include history of the family, demographic trends in family formation and dissolution, division of labor, intergenerational relationships, family violence, and family policy. Analyses of race, class, and gender are incorporated. *Preq:* SOC 201 or permission of instructor.

SOC 312 Nonwestern Families 3(3,0) Explores the complexities of family life and patterns of gender stratification in nonwestern societies. Addresses the variation in family life by and within race, ethnicity, religion, class, age, culture, and geographic region. *Preq:* SOC 201 or 311 or permission of instructor.

SOC 330 Work and Careers in Society 3(3,0) Introduces changes in the structure of work from pre-industrial to postindustrial periods. Topics include the effects of stratification on career decisions, career paths and implications for life changes, social effects of scientific management of work, unionization, globalization, the rise of multinational corporations, and cross-cultural comparisons of management styles. *Preq:* SOC 201 or permission of instructor.

SOC 331 Urban Sociology 3(3,0) Urbanization as a social process and related conditions of work, family structure, social mobility, crime, lifestyle, technology, and development of urban areas in the Third World. *Preq:* SOC 201.

SOC 350 Self and Society 3(3,0) Social psychology from the sociological viewpoint. Examination of the interactional and group influences on such individual conditions as childhood and life-course development, language, emotions, motives, sexuality, deviance, and self-concept. *Preq:* SOC 201.

SOC 351 Collective Behavior 3(3,0) Spontaneous, transitory, and sporadic group behavior: crowds, panics, riots, fads, and social movements. *Preq:* SOC 201.

SOC 356 Sociology of Entrepreneurship 3(3,0) Looks at entrepreneurship from a sociological perspective. Examines the processes by which entrepreneurs are shaped by the values and norms of family and community. The individual becomes an entrepreneur with positive socialization from these sources. Both American and cross-cultural materials are used. Training with electronic databases is provided. *Preq:* SOC 201 or consent of instructor.

SOC (R S) 371 Population and Society 3(3,0) Social, economic, and political consequences of population structure and change, including problems of food and resources, as well as population goals and policies in developing countries and the United States. *Preq:* SOC 201.

SOC 380 Introduction to Social Services 3(3,0) Fundamentals of casework practice, including philosophy and values, models of group work, and ethics in social services work. *Preq:* SOC 201.

SOC 390 The Criminal Justice System 3(3,0) Social systems analysis of criminal justice agencies; primary focus on law enforcement and corrections and their interagency relationship with courts and prosecution. *Preq:* SOC 201.

SOC 391 Sociology of Deviance 3(3,0) Patterns of deviant behavior: subcultures, careers, and lifestyles of deviants; deviance theory and research. *Preq:* SOC 201.

SOC 392 Juvenile Delinquency 3(3,0) Nature, extent, and causes of juvenile delinquency; societal attempts to control delinquent conduct and gang violence; emergence of the juvenile justice system. *Preq:* SOC 201.

SOC 393 Criminology 3(3,0) Nature and causes of criminal behavior; societal attempts to control crime; social responses to crime, criminals, and the criminal justice system. *Preq:* SOC 201.

SOC 394, H394 Sociology of Mental Illness 3(3,0) Mental illness as a social phenomenon, including cultural and social influence, organizational settings of mental health-care delivery, legal issues, patient-therapist relationships, and mental illness intervention as social control. *Preq:* SOC 201.

SOC 396 Alcoholism: Social Causes, Consequences and Treatment 3(3,0) Issues involved in alcoholism and alcohol abuse, assessment of sociological and social-psychological theories of alcoholism and prevention; societal problems associated with the misuse of alcohol. Students who previously have taken SOC 395 may not receive credit for SOC 396. *Preq:* SOC 201 or consent of instructor.

SOC 397 Drug Abuse: Social Causes, Consequences and Treatment 3(3,0) Issues involved in drug abuse other than alcohol; assessment of sociological and social-psychological theories of drug use, abuse, and treatment; societal problems associated with the misuse of drugs other than alcohol. Students who previously have taken SOC 395 may not receive credit for SOC 397. *Preq:* SOC 201 or consent of instructor.

SOC (R S) 401, 601 Human Ecology 3(3,0) See R S 401.

SOC 404, 604 Sociological Theory 3(3,0) Survey of the development of sociological theory. Required of all Sociology majors. *Preq:* SOC 201 and Junior standing or consent of instructor.

SOC H408 Honors Thesis Research I 3 Reading and research related to senior honors thesis. Completion of junior honors requirements and approval of department chair and thesis advisor required. *Preq:* SOC H303, H310, and honors status.

SOC H409 Honors Thesis Research II 3 Research and writing related to the senior honors thesis. *Preq:* SOC H408 and honors status.

SOC 414, 614 Policy and Social Change 3(3,0) Uses the sociological perspective to examine policy development, implementation, and evaluation in the public and private sectors. Specifically, course focuses on values and ethics and the effects of social change efforts on the outcomes of policy formation, social planning, and implementation. *Preq:* SOC 201 and Junior standing or consent of instructor.

SOC 430, 630 Sociology of Organizations 3(3,0) Analysis of administrative organizations and voluntary associations; applied analysis of their formal and informal group relations, communications, and effectiveness. *Preq:* SOC 201 and Junior standing or consent of instructor.

SOC 432 Sociology of Religion 3(3,0) Sociological analysis of religious systems and movements and their influence on other social institutions. *Preq:* SOC 201 and Junior standing or consent of instructor.

SOC 433, 633 Globalization and Social Change 3(3,0) Examination of the social and historical causes of development and underdevelopment. Various sociological theories of development are reviewed. Selected countries are examined in an international context. *Preq:* SOC 201 and Junior standing or consent of instructor.

SOC 435, 635 Leadership and Team Building 3(2, 3) Introduction to the area of leadership and the process of building effective teams. Examines various sociological perspectives on leadership and their role in developing and maintaining various types of groups. Students are actively involved in the educational process through their participation in experiential learning opportunities. *Preq:* SOC 201 and Junior standing or consent of instructor.

SOC 440, 640 Leisure, the Mass Media, and Culture 3(3,0) Production and consumption of leisure activities in contemporary society; popular culture, and the mass media as dominant leisure forms; social effects of leisure activities; relationship between work and leisure. *Preq:* SOC 201 and Junior standing or consent of instructor.

SOC 441, 641 Sociology of Sport 3(3,0) Sport as a social phenomenon; emphasis on leadership, discrimination, socialization, communication, conflict, and cooperation in sports; emerging social issues in contemporary sports. *Preq:* SOC 201 and Junior standing or consent of instructor.

SOC (R S) 459, 659 The Community 3(3,0) See R S 459.

SOC 460, 660 Race, Ethnicity, and Class 3(3,0) Investigation of sociological perspectives on race, ethnic relations, and social stratification. Analysis of the impact of social class on minority movements. (Not open to students who have taken SOC 431.) *Preq:* SOC 201 and Junior standing or consent of instructor.

SOC 461 Sex Roles 3(3,0) Female and male socialization; changes in statuses, roles, inequality, and opportunities in contemporary society, with cross-cultural and social class comparisons. *Preq:* SOC 201 and Junior standing or consent of instructor.

SOC 462, 662 Men, Masculinity, and Society 3(3,0) Masculinity and social order: norms, roles, relationships and activities; identity and socialization: work, family, sexuality, war, sports, including subcultural comparisons. *Preq:* SOC 201 and Junior standing or consent of instructor.

SOC 463, 663 Sociology of Parenting 3(3,0) Sociology of parenting, child rearing, parenting styles and outcomes; social change and parenting; variations by sex, race, and class; cross-cultural comparisons; research-based, with applied orientation. *Preq:* SOC 201 and Junior standing.

SOC 464 Poverty and Social Policy 3(3,0) Examines the causes and consequences of poverty in the United States. The history of poverty and social welfare programs in the United States and in Europe are compared and used to evaluate current trends in welfare reform. Analyses of class, race, and gender stratification are central to the course. *Preq:* SOC 201 or 311 or consent of instructor.

SOC (R) 471, 671 Demography 3(3,0) See R S 471.

SOC 480, 680 Medical Sociology 3(3,0) Sociocultural factors in the etiology and treatment of physical illness; medical occupations and professions; the organization of health-care delivery systems. *Preq:* SOC 201 and Junior standing or consent of instructor.

SOC 481, 681 Aging and Death 3(3,0) Sociological orientation to aging populations focusing on the impact of health care, welfare, and retirement systems. Includes dying as a social phenomenon, suicide, euthanasia, and funerals. (Not open to students who have taken SOC 383.) *Preq:* SOC 201 and Junior standing or consent of instructor.

SOC 484, 684 Child Abuse and Treatment 3(3,0) Comprehensive examination of child abuse, neglect, and exploitation as major social problems; causes, effects, and prevalence of physical, sexual, and emotional maltreatment; definitional controversies; social policy and legal considerations; therapeutic approaches for children and their caretakers; child maltreatment and the judicial system. *Preq:* SOC 201 and Senior standing or consent of instructor.

SOC 491 The Sociology of Policing 3(3,0) Introduces students to the major issues of contemporary policing in the United States from a sociological perspective. Topics include the changing functions and structure of policing, the police subculture, and the role of the police in a liberal democracy. *Preq:* SOC 390 or permission of instructor.

SOC 493, 693 Sociology of Corrections 3(3,0) Analysis of correctional alternatives. Topics include sentencing strategies and their impact, prison populations (male, female, and juvenile), inmate social structures, treatment and custody issues, community-based alternatives (probation, parole, electronic monitoring, and work release), and correctional management issues. *Preq:* SOC 390 or permission of instructor.

SOC (R) 495 Field Experience 3(1,8) Students participate in selected field placements under supervision for eight hours weekly and in a one-hour seminar per week. May be repeated once for credit. To be taken Pass/Fail only. *Preq:* SOC 380 or 390 and consent of department chair.

SOC (R) 498 Independent Study 3(1,6) Individual readings or projects in sociological areas not covered in other courses. A written proposal approved by the instructor directing the work and by the department chair prior to registration. May be repeated for a maximum of six credits. *Preq:* Consent of department chair.

SOC 499 Seminar in Selected Topics in Contemporary Sociology 3(3,0) Sociological areas of current interest are explored. May be repeated by special arrangement for a maximum of six credits. *Preq:* Consent of department chair.

SPANISH

Professors: G. Bautista, P. R. Heusinkveld, M. A. Morris, J. I. Suarez; *Associate Professors:* C. R. Adams, J. K. Hurley, S. C. King, *Chair, Assistant Professors:* C. L. Chavez, R. A. Klein; *Instructors:* N. Corrales, J. Koochoi, O. Parrilla, C. A. Robison, S. E. Spaccante; *Visiting Instructor:* M. Roth; *Lecturers:* S. K. Harris, H. Risso

SPAN 101 Elementary Spanish 4(3,1) Course for students with no previous experience in Spanish study. The fundamentals of grammar and vocabulary are taught, and a foundation is provided for building oral and written proficiency. Three hours a week of classroom instruction and one hour a week in the language laboratory.

SPAN 102 Elementary Spanish 4(3,1) Continuation of SPAN 101.

SPAN 121 Accelerated Spanish I 8(6,2) Accelerated 8-credit course for students with two or more years of Spanish in high school. Can be taken in lieu of SPAN 101 and SPAN 102. Through fundamental grammar, conversation, composition, and dictation, proficiency is stressed. May not be taken by students who have completed SPAN 101 or 102.

SPAN 151 Spanish for Graduate Students 3(3,0) Intensive program only for graduate students preparing for the reading examination in Spanish. A minimum grade of B on a final examination will satisfy graduate school foreign language requirement. May be repeated once. To be taken Pass/Fail only. *Preq:* Graduate standing.

SPAN 201, H201 Intermediate Spanish 3(3,0) Intermediate course to practice listening, speaking, reading, and writing. Grammatical structures and basic vocabulary are reviewed systematically. Includes literary and cultural perspectives. *Preq:* SPAN 102, SPAN 121, or consent of department chair.

SPAN 202, H202 Intermediate Spanish 3(3,0) Continuation of SPAN 201. *Preq:* SPAN 201.

SPAN 221 Accelerated Spanish II 6(6,0) Accelerated intermediate course that can be taken in lieu of SPAN 201 and SPAN 202. Through conversation, composition, dictation, and intensive grammar review, proficiency is stressed. Includes literary readings and cultural perspectives. May not be taken by students who have completed

SPAN 201 or 202. *Preq:* SPAN 102, SPAN 121, or consent of department chair.

SPAN 299 Foreign Language Drama Laboratory 1(0,3) Participation in foreign language drama productions. No formal class meetings, but an average of three hours per week in a foreign language drama workshop for production. May be repeated for a total of three credits. *Preq:* Consent of instructor directing the play.

SPAN 301 Introduction to Hispanic Literary Forms 3(3,0) Introduction to the basic structures and elements of fiction, poetry, drama, and essay, including literary and critical theory, with readings in 19th and 20th century Spanish and Spanish-American literatures. *Preq:* SPAN 202.

SPAN 302 Intermediate Spanish Grammar and Composition 3(3,0) Intensive review of Spanish structure, verbs, idioms, and vocabulary with an introduction to syntax and stylistics through controlled and free composition. *Preq:* SPAN 202 or consent of department chair.

SPAN 303 Survey of Spanish Literature I 3(3,0) Literary movements, influences, and authors from the beginnings to the end of the 17th century. Representative works, discussions. *Preq:* SPAN 202 or consent of department chair.

SPAN 305 Intermediate Spanish Conversation and Composition I 3(3,0) Practice in spoken Spanish with emphasis on vocabulary, pronunciation, intonation, and comprehension. Written work to increase accuracy. Assignments in the language laboratory. *Preq:* SPAN 202 or consent of department chair.

SPAN 307 The Hispanic World: Spain 3(3,0) Introduction to the significant aspects of the culture of Spain from its origins to the present. Emphasis on the artistic, social, historical, political, and contemporary issues of the Iberian peninsula. *Preq:* SPAN 202 or consent of department chair.

SPAN 308 The Hispanic World: Latin America 3(3,0) Introduction to the significant aspects of the culture of Spanish-American countries. Emphasis is placed on the development of the political, economical, geographical, social, and artistic aspects of Spanish America from the indigenous period to the present. *Preq:* SPAN 202 or consent of department chair.

SPAN 309 Introduction to Spanish Phonetics 3(3,0) Study of the basic concepts of phonetics and phonology, fundamental principles of Spanish pronunciation and International Phonetic Alphabet. *Preq:* SPAN 202 or consent of department chair.

SPAN 311 Survey of Spanish-American Literature 3(3,0) Literary movements, influences, authors, and works from the Colonial period to the present. *Preq:* SPAN 202 or consent of department chair.

SPAN 316 Spanish for International Trade I 3(3,0) Spoken and written Spanish common to the Hispanic world of business and industry, with emphasis on business practices and writing and translating business letters and professional reports. Cross-cultural references provide opportunity for comparative and contrastive analysis of American and Spanish cultural patterns in a business setting. *Preq or Coreq:* SPAN 202 and 305, or consent of department chair.

SPAN (PO SC) 382 Spanish Foreign Language News 1(1,0) See PO SC 382.

SPAN (PO SC) 385 Topical Issues in Spanish 1(1,0) See PO SC 385.

SPAN H391 Honors Introduction to Hispanic Literary Forms 1(1,0) One-hour independent study to allow honors students to pursue supervised research on some aspect of Hispanic literature. *Coreq:* SPAN 301 and membership in Calhoun College Honors Program.

SPAN H392 Survey of Spanish Literature (Honors) 1(1,0) One-hour independent study to allow honors students to pursue supervised research on witchcraft in 15th and 16th century Spain. *Coreq:* SPAN 303 and membership in Calhoun College Honors Program.

SPAN H393 The Hispanic World: Latin America (Honors) 1(1,0) One-hour independent study to allow honors students to pursue supervised research on a topic related to Hispanic American history, politics, geography, economics, social institutions, or artistic movements. *Coreq:* SPAN 308 and membership in Calhoun College Honors Program.

SPAN 398 Directed Reading 1-3(1-3,0) Directed study of selected topics in Spanish literature, language, and culture. May be repeated for a maximum of six credits. *Preq:* Consent of department chair.

SPAN 401 New Spanish Fiction 3(3,0) Study of selected readings by popular emerging and established authors of Spain, with emphasis on current cultural trends. Readings include, but are not limited to, detective novels, regional fiction, and fiction from marginalized groups in Spain. *Preq:* SPAN 300-level literature course or consent of department chair.

SPAN 403 Spanish American Women Writers 3(3,0) In-depth study of selected literary works written by Spanish American women. Representative authors are studied within their philosophical and socio-political contexts. *Preq:* SPAN 300-level literature course or consent of department chair.

SPAN 404 Nineteenth and Twentieth Century Spanish Literature 3(3,0) Selected readings from major authors in Spain. Emphasis on readings in poetry, theatre, short story, and novels from the nineteenth century to the early twentieth century. *Preq:* Spanish 300-level literature course or consent of department chair.

SPAN 405 Hispanic Nonfiction 3(3,0) Comparative and contrastive readings of journal articles, essays, biographies, travel accounts, and other contemporary nonfiction texts by Spanish and Spanish-American writers. *Preq:* 300-level literature, or culture course or consent of department chair.

SPAN 406 Hispanic Narrative Fiction 3(3,0) Topic-generated readings from Spanish America and/or Spain. Readings consider gender issues, the family, ethnicity, religion, politics, history or socio-economic issues in the Hispanic world. *Preq:* Spanish 300-level literature, or culture course or consent of department chair.

SPAN 407 Hispanic Film 3(3,0) Films are "read" as texts that mirror Hispanic society. Beside learning about cinematographic techniques in Spanish, topics include comparative analysis of film and lit-

erature, film as propaganda, film as "blockbuster," and the cinematic depiction of social, cultural, and historical realities of Hispanic nations. *Preq:* Spanish 300-level language, literature, or culture course or consent of department chair.

SPAN 409 Comprehensive Writing in Spanish 3(3,0) Study of stylistics in addition to grammar review; writing paragraphs, short compositions, and creative papers in Spanish on both fiction and non-fiction topics. *Preq:* Any 300-level Spanish course or consent of department chair.

SPAN 411 Advanced Spanish Conversation and Composition 3(3,0) Continuation of SPAN 305 with emphasis on greater fluency and sophistication in oral and written expression. *Preq:* SPAN 305 or consent of department chair.

SPAN 412 Translation Theories and Techniques 3(3,0) Introduction to theories and techniques of translations, using a variety of texts as a starting point for discussion of stylistic and grammatical difficulties. Course is eminently practical, with student translations being systematically compared with professional translations. *Preq:* Spanish 300-level literature course or consent of department chair.

SPAN 416 Spanish for International Trade II 3(3,0) Study of the language and cultural environment of the Spanish-speaking markets of the world, including linguistic and cultural idioms which support global marketing in general and international marketing of textiles, agricultural products, and tourism in particular. *Preq:* SPAN 316.

SPAN 417 Professional Communication 3(3,0) Skill-oriented course, taught in a seminar format. Students learn established "protocol" for addressing various Spanish speaking audiences and learn to give professional presentations in Spanish. *Preq:* Spanish 300-level course or consent of department chair.

SPAN 422 The Contemporary Spanish-American Novel 3(3,0) New trends in the development of the Spanish-American novel from the 1940s to the present. *Preq:* Spanish 300-level literature course or consent of department chair.

SPAN 435 Contemporary Hispanic Culture 3(3,0) Study of social, political, economic, and artistic manifestations of contemporary Hispanic culture. *Preq:* Spanish 300-level civilization or culture course or consent of department chair.

SPAN H438 Spanish Honors Research 3(3,0) Individual honors research conducted under direction of the Language Department faculty. *Preq:* Junior standing and membership in Calhoun College Honors Program.

SPAN H439 Spanish Honors Thesis 3(3,0) Individual honors research conducted and thesis completed under direction of Language Department faculty member. *Preq:* Junior standing, SPAN H438, and membership in Calhoun College Honors Program.

SPAN H491 Hispanic Narrative Fiction (Honors) 1(1,0) One-hour independent study to allow honors students to pursue supervised research on the socio-political climate under Franco's dictatorship, with emphasis on contemporary literary theory. *Coreq:* SPAN 406 and membership in Calhoun College Honors Program.

SPAN H492 Contemporary Latin American Novel (Honors) 1(1,0) One-hour independent study to allow honors students to pursue supervised research in the literary and cinematographic images of magic realism. *Coreq:* SPAN 422 and membership in Calhoun College Honors Program.

SPAN 498 Independent Study 1-3(1-3,0-3) Directed study of selected topics in Spanish language, literature, and culture. May be repeated for a maximum of six credits. *Preq:* Consent of department chair.

SPAN 499, 699 Spanish Literature, Language, and Culture 3(3,0) Selected topics and themes that have characterized Spanish literature, language, and culture throughout the centuries. May be repeated for a maximum of six credits. *Preq:* SPAN 303, 311, 404, or consent of department chair.

SPECIAL EDUCATION

Professor: W. R. Fisk, Chair; R. P. Green, Jr.; *Associate Professor:* A. Katsiyannis; *Assistant Professors:* J. P. Hodge, P. M. Stecker; *Visiting Assistant Professors:* L. M. Finsel, S. N. Wilson; *Lecturers:* M. D. Miller, K. A. Tosini

ED SP 371 Characteristics of the Mildly Handicapped 3(3,0) Surveys the characteristics which distinguish the mildly/moderately handicapped from the more severely handicapped. *Preq:* Minimum grade-point ratio of 2.0.

ED SP 402, H402, 602 The Exceptional Child 3(3,0) Survey of exceptionalities including students who are gifted; nature, cause, and treatment of difficulties; educational problems. *Preq:* Minimum grade-point ratio of 2.0.

ED SP 413 Directed Teaching in Special Education 12(1,33) Comprehensive course provides a full-time, semester-long experience for potential special education teachers preparing to work with mildly/moderately handicapped students. It is generally the last course experience that allows practice under the supervision of master teachers. *Preq:* ED SP 371, 491, 492, 493, 494, 496.

ED SP (PRTM) 414, 614 Recreation and Leisure for Special Populations 3(3,0) See PRTM 414.

ED SP 416 Teaching Internship in Special Education 6(1,15) Full-time, supervised teaching internship in K-12 special education for one semester in cooperation with a participating South Carolina school. Reserved for students seeking certification in critical-need teaching areas. May be repeated for a maximum of 12 credits. To be taken Pass/Fail only. *Preq:* ED SP 371, 491, 493, 494, 496. Application approved by department.

ED SP 436, 636 Selected Topics 1-3(1-3,0) Offered as needed to address current issues and topics not covered in other Special Education courses. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Junior standing in Education.

ED SP 468 Early Intervention for Infants and Children with Special Needs 3(3,0) Provides students with a working knowledge of the history of early intervention, legal precedence for providing early intervention services, and effective instructional techniques for working with infants and young children with disabilities and their families. *Preq:* ED SP 402, SOC 311.

ED SP 469, 669 Characteristics of Children with Emotional Disorders 3(3,0) Intensive study of the meaning and concepts associated with students with emotional disorders. Analysis of the cause and characteristics of these students with emotional disorders. *Prq:* ED F 302 or PSYCH 201, ED SP 402, and a minimum grade-point ratio of 2.0, or consent of instructor.

ED SP 470, 670 Characteristics of Individuals with Learning Disabilities 3(3,0) Provides specific knowledge of definitions, evaluation procedures, cognitive, social, academic, and functional skills of individuals with learning disabilities across the lifespan. *Prq:* ED F 302, ED SP 402, PSYCH 201, admission to the professional program, or consent of instructor.

ED SP 472, 672 Characteristics of Individuals with Mental Retardation 3(3,0) Characteristics of mental retardation across the lifespan: learning, behavioral, and developmental aspects are examined. *Prq:* Admission to the professional program.

ED SP 473, 673 Educational Procedures for Individuals with Mental Retardation 3(3,0) Identification, selection, and preparation of functional curriculum materials and pedagogy for teaching students with mental retardation are emphasized. A multidisciplinary, student-centered approach to program planning provides the framework. *Prq:* Admission to the professional program.

ED SP 474, 674 Educational Procedures for Children with Emotional Disorders 3(3,0) Procedures for teaching students with emotional disorders; curriculum and instructional modifications, program planning, facility adaptation, behavior controls, communicating with mental health specialists, and developing readiness for return to regular class. *Prq:* Admission to the professional program.

ED SP 475, 675 Educational Procedures for Individuals with Learning Disabilities 3(3,0) Provides knowledge of educational evaluation and instructional procedures to improve outcomes for individuals with learning disabilities. *Prq:* ED F 302, ED SP 402 and PSYCH 201; or consent of instructor.

ED SP 476, 676 Practicum in Learning Disabilities 3(2,3) Practical experience in teaching individuals with learning disabilities under the supervision of college faculty and local teachers of individuals with learning disabilities. *Prq:* ED SP 402, 470, 475, admission to the professional program, or consent of instructor.

ED SP 477, 677 Characteristics of Children Who Are Gifted 3(3,0) Acquaints students with definitions, incidences, characteristics, identification procedures, and curriculum options for the gifted. *Prq:* ED SP 402 and minimum grade-point ratio of 2.0.

ED SP 478, 678 Practicum in Emotional Disorders 3(2,3) Practical experience in teaching students with emotional disorders under the supervision of college faculty and teachers of students with emotional disorders. *Prq:* ED SP 402, 469, 474, admission to the professional program; or consent of instructor.

ED SP 479, 679 Practicum in Mental Retardation 3(2,3) Experience in teaching individuals with mental retardation under the supervision of

college faculty and teachers of individuals with intellectual disabilities. *Prq:* ED SP 402, 472, 473, admission to the professional program, or consent of instructor.

ED SP 491 Assessment of Students with Mild Disabilities 3(3,0) Focuses on ecological, behavioral, and psychological assessment of students with mild disabilities. Content emphasizes a multidisciplinary approach to screening, diagnosis, eligibility, and evaluation for special education services, program development, and implementation. *Prq:* ED SP 371; concurrent enrollment in ED SP 492, 493, 496; and admission to the professional program.

ED SP 492 Educational Interventions for Individuals with Mild Disabilities 3(3,0) Emphasizes skills needed in developing and implementing educational programs for individuals with mild disabilities. *Prq:* ED SP 371 or consent of instructor; concurrent enrollment in ED SP 491, 493, 494, 496; and admission to the professional program.

ED SP 493 Behavioral Skill Intervention for the Handicapped 3(3,0) Prepares prospective special education teachers to develop and implement special education programs in areas of behavioral intervention skills with the mildly/moderately handicapped. *Prq:* ED SP 371 or consent of instructor; concurrent enrollment in ED SP 491, 492, 494, 496; and minimum grade-point ratio of 2.0.

ED SP 494 Teaching Reading to Students with Mild Disabilities 3(3,0) Emphasizes the knowledge and skills necessary for teaching reading to students with mild disabilities. *Prq:* ED SP 371, ED 461, 498, or consent of instructor; concurrent enrollment in ED SP 491, 492, 493, 496; and admission to the professional program.

ED SP 495 Communication and Collaboration for the Resource Teacher 3(3,0) [W.3] Focuses on the development of written communication skills to enhance special education teacher's collaboration with parents, regular educators, public and private agencies. *Prq:* ED SP 491, 492, 493, 494, 496, and concurrent enrollment in ED SP 413 or 416.

ED SP 496 Special Education Field Experience 3(1,6) Provides theory and extensive practice for potential special education teachers preparing for working with mildly/moderately handicapped students prior to the directed teaching experience. *Prq:* ED SP 371; concurrent enrollment in ED SP 491, 492, 493, 494; and minimum grade-point ratio of 2.0.

SPEECH

Associate Professors: L. J. Eastland, D. S. Geddes, Chair; *Assistant Professors:* K. K. Halone, S. J. Madden, J. M. Wise; *Instructors:* C. O. Bishop, M. H. Dehner, L. D. Egan, C. A. Harding, M. B. Hovind, N. M. Laster, P. R. Simmons, P. L. Williams; *Lecturer:* E. R. Smith

SPCH 150 Introduction to Speech Communication 3(3,0) [O.3] Provides students with an overview of theoretical approaches to the study of communication, including the theory and practice of interpersonal/small group/intercultural/public communication.

SPCH 162 Forensic Laboratory 1(0,3) Research, preparation, and practice leading to participation in on-campus and intercollegiate debate and individual events competition. May be repeated for a maximum of four credits.

SPCH 163 Advanced Forensic Laboratory 1(0,3) Advanced research, preparation, and practice leading to continued participation in on-campus and intercollegiate debate and individual events competition. May be repeated for a maximum of four credits. *Prq:* SPCH 162.

SPCH 250 Public Speaking 3(3,0) [O.3] Practical instruction in public speaking; practice in the preparation, delivery, and criticism of short speeches. Develops an understanding and knowledge of the process of communication.

SPCH 251 Business and Professional Speaking 3(3,0) [O.3] Skills-intensive course for researching, organizing, and delivering speeches for business and professional settings.

SPCH 268 Voice and Diction 3(3,0) Practical work to improve vocal clarity and tonal quality of the student's speech. Corrects such voice and diction problems as improper enunciation and extreme dialects.

SPCH 300 Communication in a World Context 3(3,0) In-depth examination of differences in communication practices and meanings as seen through a global perspective. *Prq:* SPCH 150, 250, or consent of instructor.

SPCH 301 Speech Communication Theories 3(3,0) Various theories and models of communication characterizing the field of speech communication. Focuses on how communication is conceptualized from different theoretical perspectives.

SPCH 302 Mass Communication Theory 3(3,0) Survey of the breadth and history of theories of mass communication and mass media from the 19th century to the present. Especially emphasized are contemporary schools of thought, theoretical debates, and the continuing controversies in the field.

SPCH 310 Communication Research Methods 3(3,0) Students study methods of communication research, preparing research projects, conducting research studies, ethnography, observation, sampling, measurement, analysis, and the relationship between theory and research.

SPCH 320 Television Journalism 3(3,0) Explores both the philosophy of journalism and the applied skills of the journalist. In addition to classroom activities, students experience television journalism first-hand as participants on a weekly on-campus television news program.

SPCH 330 Nonverbal Communication 3(3,0) Develops a knowledge of the functions of nonverbal behaviors in human interaction. This includes the study of gesture and movement, physical appearance, vocal behavior, immediacy, time and space, and intercultural differences. Promotes understanding of nonverbal rules.

SPCH 340 Negotiations Communication 3(3,0) Develops a knowledge of the basic strategies and elements of communication used in effective negotiation. Includes techniques of dealing with people, interests, options, and the criteria necessary to reach agreements and objectives.

SPCH 348 Interpersonal Communication 3(3,0) Survey of the theories and research in interpersonal communication with emphasis on the application of research findings and developmental strategies for intra- and inter-cultural relationships.

SPCH 350 Small Group and Team Communication 3(3,0) Examines the principles and skills involved in effective small-group communication.

SPCH 360 Persuasion 3(3,0) Theories of persuasion and propaganda. Practical instruction in analysis and construction of persuasive messages. *Preq:* SPCH 250.

SPCH 361 Argumentation and Debate 3(3,0) Basic principles of argumentation with emphasis on developing skills in argumentative speech. The role of the advocate in contemporary society with an emphasis on and an appreciation of formal debate. *Preq:* Consent of instructor.

SPCH 362 Organizational Communication Simulation 3(3,0) Helps students develop and apply communication skills which are useful in a variety of organizational settings: taking and conducting interviews, group decision making, and oral reporting. Discusses communication processes and provides personal and professional development. *Preq:* SPCH 250 or consent of instructor.

SPCH 363 Oral Interpretation of Literature 3(3,0) Analysis and oral interpretation of selected poetry and prose; training in development of effective tone production.

SPCH 364 Organizational Communication 3(3,0) Examination of the process, theories, and techniques of communications within small groups and other organized bodies.

SPCH 365 Mass Communication: History and Criticism 3(3,0) Critical examination of mass communication in America, including discussions of history, theory, and current issues in television, film, popular music, telecommunications, and other media.

SPCH 366 Special Topics in Speech 3(3,0) Consideration of select major areas of study in speech. May be repeated with consent of department chair.

SPCH 369 Political Communication 3(3,0) Examination of American political rhetoric after 1900, focusing on such notable speakers as Franklin D. Roosevelt, John F. Kennedy, and Martin Luther King, Jr.

SPCH 390 Speech and Communication Studies Internship 3(0,9) Preplanned, preapproved, faculty supervised internship provides Speech and Communication Studies majors with field experience in areas related to their curriculum. May be repeated for a maximum of six credits. To be taken Pass/Fail only. *Preq:* Junior standing and consent of faculty advisor.

SPCH (LANG) 400 Phonetics 3(3,0) See LANG 400.

SPCH 455 Gender Communication 3(3,0) Explores the ways communication behaviors and perceptions of communication behavior are affected by gender. The effects of gender on a variety of communication contexts are examined, including interpersonal, small group, organizational, and mass communication.

SPCH 460 Communication and Conflict Management 3(3,0) Introduces the study of communication practices in conflict situations within various personal and professional settings. Emphasis is on the central role of communication in the understanding and management of conflict. *Preq:* SPCH 150 or 250 or consent of instructor.

SPCH 464, 664 Advanced Organizational Communication 3(3,0) Application of speech communication methodology to the analysis of organizational communication processes. Students study methods of organizational communication analysis and intervention. *Preq:* SPCH 364 or consent of instructor.

SPCH 480 Intercultural Communication 3(3,0) Introduces the process of communication between and among individuals from different cultures or subcultures. Emphasis is on the effect of cultural practices within various communication relational contexts such as interpersonal, small group, and organizational communication. *Preq:* SPCH 150 or 250 or consent of instructor.

SPCH (ENGL) 491, 691 Classical Rhetoric 3(3,0) See ENGL 491.

SPCH (ENGL) 492, 692 Modern Rhetoric 3(3,0) See ENGL 492.

SPCH 495 Senior Communication Seminar 3(3,0) Students apply their knowledge and education to a significant research project involving the student's communication research interest. Project(s) culminate in a written document and a public presentation/discussion of the student's research. *Preq:* Senior standing, Speech and Communication Studies major, and permission of instructor.

SPCH 499 Independent Study 1-3(1-3,0) Tutorial work for students with special interests or projects in speech communication outside the scope of existing courses. *Preq:* Consent of the department chair.

TECHNOLOGY AND HUMAN RESOURCE DEVELOPMENT

Professors: W. L. Havice, C. H. Isbell, G. G. Lovedahl, Chair; W. D. Paige, D. G. Tesolowski; *Associate Professors:* C. C. Linnell, C. D. Schmittow; *Assistant Professor:* J. B. Simmons; *Visiting Instructor:* W. B. Dory

THRD 110 Introduction to Industrial Technology 3(3,0) Examines the philosophy and structure of industrial technology education in the public school system and the philosophy and organization of human resource development in industry. Students are given an orientation to a major in industrial education and an overview of the principles of technology.

THRD 130 Woodworking 12(1,3) Study of wood, its properties, and the requisite skills necessary for understanding the use of wood in our technological way of life.

THRD 160 Training Programs in Industry 3(3,0) Introduction and first-hand experience in industrial training programs. Emphasis is on observing and participating in actual training situations as well as communications and media usage in industry. *Preq:* THRD 110.

THRD 180 Introduction to Technical Drawing and Computer-Aided Drafting 3(1,6) Introductory drafting course utilizing traditional drafting techniques and computer software to explore technical drawing and orthographic projection through construction of multiview and isometric projections, sectional and auxiliary views, dimensioned working drawings, developments and intersections. Freehand sketching is a means of problem solving and analysis.

THRD 181 Advanced Technical Drawing and Computer-Aided Drafting 3(1,6) Primary focus is to provide students with the opportunity to expand the application of computer-aided drafting in the areas of mechanical and architectural drawing. Emphasis is on the development of complete working drawings incorporating instruction in the areas of production, manufacturing, and construction. *Preq:* THRD 110, 180 or equivalent, and consent of instructor.

THRD 220 Manufacturing Technology I: Systems 3(1,6) Introduction to management, personnel, and production systems studies through the creation of a corporation. Includes product identification, product research and design, selection of processes, plant design, production systems, and system enhancement. *Preq:* THRD 110 or consent of instructor.

THRD 222 Metal Processes 3(1,6) Material separating, forming, and combining practices in the metals industries through the study of basic casting, welding, and sheet-metal techniques.

THRD 224 Machine Tool Processes 3(2,3) Basic practical shop experiences on the lathe, drill press, milling machine, and shaper. Benchmark, measuring tools, theory, and demonstrations related to a survey of fundamental machining practices.

THRD 230 Construction Technology I: Materials 3(2,3) Introduction to the commonly used building materials and methods of combining them in present day construction. *Preq:* THRD 110 or consent of instructor.

THRD 240 Power Technology I: Production 3(2,2) Study of power in terms of energy sources and the generation of power. Emphasis is on the development of insights and understandings of the scientific and operational principles involved in the production and utilization of power. *Preq:* THRD 110 or consent of instructor.

THRD 250 Electricity 3(2,3) Theory and application of DC and AC fundamentals, including instrumentation, power sources, circuit analysis, motors, construction wiring, and electronic principles and components.

THRD 280 Communications Technology I: Processes and Materials 3(2,3) Topics include graphic communications, photography, computer application and use as a visual communication medium, and audio/video production and application.

THRD 281 Technical Airbrush Illustration 3(1,6) Technical application of airbrush technique. Methods of depicting objects on paper, photograph retouching, sandblasting glass, and fabric decoration are all dealt with, using a single-action airbrush.

THRD 310 Arts and Creativity for the Elementary Child 3(2,3) Provides elementary and early childhood teacher with an opportunity to develop technological literacy, art/craft skills in a variety of media, and an understanding of their applications to the curriculum in a classroom environment. *Preq:* Junior or Senior standing in Early Childhood or Elementary Education or consent of instructor.

THRD (ED F) 315 Integrating Computers into the Classroom 1(0,2) See ED F 315.

THRD 320 Plastics and Plastic Processes 3(2,3) Introduction to thermoplastic materials, basic processing, fabricating, and finishing operations. Related careers and technological advances are also studied.

THRD 360 Industrial Organizations and Safety 3(3,0) Study of the relationship of training and safety personnel to the kinds of tasks they are asked to perform in industrial situations. Emphasis is on safety knowledge development and on techniques which may be used in industrial safety training.

THRD 370 Motivation and Discipline in Vocational Education 3(3,0) Provides classroom teachers and prospective teachers with knowledge and skills in techniques of student discipline and motivation with application to the occupational education settings.

THRD 371 Management of Industrial Education Laboratories 3(2,2) Management and operation of unit and multiple-activity laboratories, including laboratory design, selection and procurement of tools and equipment, budgeting management, and coordination of activities in laboratory courses.

THRD 390 Industrial Cooperative Experience I 6(0,18) SS Full-time work experience program in industry. Students are requested to register with the instructor one semester prior to the summer in which they plan to enroll. *Preq:* Vocational-Technical Education option only.

THRD (G C) 410, 610 Selected Topics 1-3(1-3,0) Subject areas organized according to program needs. Content is planned cooperatively by the University and the school system or agency requesting the course. May be repeated for a maximum of 18 credits, but only if different topics are covered. *Preq:* Consent of instructor.

THRD 413, 613 Contemporary Technological Problems 3(3,0) Provides students with an understanding of the problems and contributions of technology. Examples of these relationships are taken from historical accounts and from analyses of contemporary technological intervention both in industrialized and nonindustrialized countries.

THRD 415, 615 History and Philosophy of Industrial and Vocational Education 3(3,0) Study of industrial and vocational education programs with the intent of developing a sound individual philosophy of industrial and vocational education. General topics covered: history, local, state, and federal legislation; types of vocational-technical programs; professional organizations; manpower utilization, vocational guidance, and training; industry, labor, and school relationships.

THRD 420, 620 Manufacturing Technology II: Materials and Processes 3(2,3) Continuation of THRD 220 with emphasis on materials and processes of manufacturing. Attention is given to specific materials separating, forming, and combin-

ing practices and equipment and on the competitive aspects of manufacturing. *Preq:* THRD 220 or consent of instructor.

THRD 430, 630 Construction Technology II: Practices and Systems 3(2,3) Study of industrial practices and systems affecting man, materials, and equipment associated with construction industries. Activities are directed toward developing a working knowledge of construction technology and a framework for incorporating this instruction into programs in the public and private sectors. *Preq:* THRD 230.

THRD 440, 640 Power Technology II: Transmission and Control Systems 3(2,3) Continuation of THRD 240. Instruction in transmitting and controlling power for utilization in such areas as manufacturing, communications, construction, and transportation. Introduces concepts of automation and robotics to enable the classroom teacher and industry personnel to gain necessary insights into this important area of technology. *Preq:* THRD 240.

THRD 441, 641 Internal Combustion Engines 3(2,3) Study of the internal combustion engine: theory of operation, applications, methods of analyzing performance, and troubleshooting malfunctions. Intended as an elective for Industrial Technology Education and Vocational-Technical Education option majors desiring proficiency in this essential area of industrial education. *Preq:* THRD 240 or consent of instructor.

THRD 450, 650 Electronics for Educators 3(1,6) Principles of electronics as applied in communications and automatic controls involving transistors, integrated circuits, and other electronic devices and materials for the preparation of teachers of industrial arts and vocational-technical electricity and electronics. *Preq:* THRD 250 or equivalent.

THRD 460, 660 Developing Training Programs for Industry 3(3,0) Study of the identification, selection, and organization of subject matter appropriate for industrial training programs. Emphasis is placed on analysis techniques, session and demonstration planning, written instructional materials development, trainee evaluation, and planning instructional schedules. *Preq:* Senior standing in Human Resource Development option or consent of instructor.

THRD 465, 665 Conducting and Evaluating Training Programs for Industry 3(3,0) Basic concepts of supervision, administration, and management of training programs. Emphasis is on determining training requirements, planning, directing, and evaluating training programs. *Preq:* THRD 160, 460 or consent of instructor.

THRD 468, H468, 668 Public Relations 3(3,0) Emphasizes the techniques and methods of effective public and industrial relations which contribute to understanding and cooperation of labor, business, professional, educational, and industrial groups.

THRD 470, 670 Course Organization and Evaluation 3(3,0) Problems, techniques, and procedures in the preparation, selection and organization of subject matter for instructional purposes. Methods, techniques, and preparation of materials used in the evaluation of student achievement in industrial education subjects.

THRD 471, 671 Teaching Industrial Subjects 3(3,0) Effective methods and techniques of teaching industrial subjects. Emphasis is given to class organization, preparation of lesson outlines, and audio-visual aids. *Preq:* ED F 335.

THRD 472 Advanced Instructional Methods 3(3,0) Familiarizes students with the various equipment, materials, and techniques associated with the delivery of instruction. Students design, produce, and present materials to meet specific educational objectives. *Preq:* THRD 471 or one year of teaching experience.

THRD 473, 673 Competency Testing in Vocational Subjects 3(3,0) Study of competency testing in vocational education which includes educational objectives and measurement; construction and use of oral, objective, short answer, matching, essay, and performance tests; and treatment of test data for grade assignments and statistical analysis.

THRD 474, 674 School Safety 3(3,0) Study of the principles of school safety emphasizing safety analyses, accident prevention, remediation of unsafe conditions, development and use of instructional materials, and school liability.

THRD 477 Directed Teaching 12(0,36) Supervised observation and teaching in cooperation with selected public schools in which opportunities are provided for securing experience in teaching industrial subjects. *Preq:* THRD 371, 471, and grade-point ratio required for graduation.

THRD 478 Internship in Vocational Technical Education 1 6(0,18) Supervised observation and teaching in cooperation with selected area vocational centers, high schools, and technical colleges to provide experience in teaching specified trades and industrial subjects. *Preq:* THRD 371 and consent of instructor.

THRD 479 Internship in Vocational Technical Education II 6(0,18) Continuation of THRD 478. *Preq:* THRD 478 and consent of instructor.

THRD (AG ED, ED F) 480, 680 Educational Applications of Microcomputers 3(2,2) [C.3] See ED F 480.

THRD (AG ED, ED F) 482, 682 Advanced Educational Applications of Microcomputers 3(2,2) See ED F 482.

THRD 483, 683 Architectural Drafting for Industrial Education 3(1,6) Study of the major aspects of architectural drawing, such as plot, floor, and foundation plans; wall sections; and elevations. *Preq:* THRD 180.

THRD 484, 684 Communications Technology II: Systems 3(2,2) Continuation of THRD 280. Includes theory and operation of communications systems: telegraph, telephone, radio, television, satellites, sound/video recorders, lasers, and computers. Instruction on strategies for interpreting this area of technology to industry personnel and public school students is emphasized. *Preq:* THRD 280.

THRD 486, 686 Instructional Media Development 3(1,4) Basic instructional media development techniques are presented. Students develop material using authoring software such as HyperCard, transparencies using Persuasion and/or Powerpoint, and fully storyboarded, scripted, and edited digital as well as analog video.

THRD 490 Industrial Cooperative Experience II 6(0,18) Continuation of THRD 390. *Prq:* Vocational/Technical Education option only.

THRD 491 Special Projects 3(3,0) Students are assigned projects in accordance with their needs and capabilities. Projects are either experimental, theoretical, or developmental and cover subjects not thoroughly covered in other courses. Written project approval required before registering. *Prq:* Consent of instructor.

THRD 492, 692 Advanced Projects 1-6 Student gains depth in content by completing a project under the supervision of an instructor in one of the following subject areas: arts and crafts, drawing and design, electricity and electronics, graphic arts, metalworking, occupational education, power, and woodworking. Written project approval required before registering. *Prq:* Consent of instructor.

TEXTILE CHEMISTRY

Professors: J. R. Aspland, H. M. Behery, M. J. Drews, M. S. Ellison, B. C. Goswami, C. W. Jarvis, D. V. Rippey, C. D. Rogers, E. A. Vaughn; *Associate Professors:* R. V. Gregory, *Director:* O. F. Hunter, Sr., G. C. Lickfield

T C 303 Textile Chemistry 3(3,0) Study of the properties and reactions of aliphatic and aromatic organic compounds. Emphasis is placed on mechanistic interpretations and the development of synthetic schemes leading to polyfunctional compounds of the types encountered in the textile industry. *Prq:* CH 102. *Coreq:* MTHSC 206 or 207.

T C 304 Textile Chemistry 3(3,0) Fundamental principles of physical chemistry with emphasis on areas frequently encountered in the textile industry including thermodynamics, kinetics and solution properties. These concepts are applied to the study of organic compounds and organic reaction mechanisms. *Prq:* T C 303.

T C 305 Textile Chemistry Laboratory 1(0,3) Introduction to the techniques used in the synthesis and characterization of organic compounds. *Coreq:* T C 303.

T C 306 Textile Chemistry Laboratory 1(0,3) Techniques used in the measurement of the physicochemical properties of polymers and textile chemicals. *Coreq:* T C 304.

T C 405 Principles of Textile Printing 3(2,3) Development of modern textile printing systems is studied. In addition, the colloidal requirements of colorants, thickener compositions, rheology of printing pastes, and the various physical requirements necessary for a successful printing system in a modern plant are examined. *Prq:* Consent of instructor.

T C 406 Textile Finishing—Theory and Practice 3(2,3) Study of the application of chemicals to textile substrates and how they affect the substrate's physical and chemical properties. Emphasizes the theories of chemical modification of textiles as well as the technology of finishing.

T C 415, H415, 615 Introduction to Polymer Science and Engineering 3(3,0) Chemistry of monomers and polymers and the chemical and physical properties of polymers are discussed em-

phasizing fiber forming, synthetic polymers. Includes molecular characterization, structure, morphology, and mechanical properties as they relate to the design of polymer systems for end uses in textiles, geotextiles, plastics and fiber-reinforced composite materials. *Prq:* CH 201 and 330 or 224, T C 304, or consent of instructor.

T C 416, 616 Chemical Preparation of Textiles 3(2,3) Chemicals used in the preparation of fabric for dyeing and finishing. Oxidizing and reducing agents and their control and effect on various fibers. Colloidal and surface active properties of various compounds and the fundamental factors influencing these properties.

T C 417 Polymer and Fiber Laboratory 1(0,3) High molecular weight polymers are prepared from monomers, and their chemical and physical properties are measured as functions of critical end use parameters using instrumental and physical methods. *Coreq:* T C 415.

T C 457, H457, 657 Dyeing and Finishing I 3(3,0) Understanding of the physical, chemical, and mechanical principles behind the application of colors and finishes to textiles. Requires an appreciation of fiber chemistry and morphology, dye and finish structures and reactivity and the mechanical principles behind the equipment used to effect transfer of these chemicals onto the textile substrate.

T C 458, H458, 658 Dyeing and Finishing II 3(3,0) Kinetics and equilibria of dyeing processes. The use of conductivity, diffusion, and other methods useful for measuring absorption of isotherms and dyeing rates and the general thermodynamic relationships applicable to dyeing operations. Fiber properties such as zeta potential, dye sites, relative amorphous area available are included.

T C 459 Dyeing and Finishing Laboratory I 1(0,3) Introduces students to common dyeing and printing methods and to some of the machinery necessary to carry out dyeing operations. *Coreq:* TC 457.

T C 460 Dyeing and Finishing Laboratory II 1(0,3) Covers finishing in addition to dyeing operations and their instrumental control. *Coreq:* T C 458.

TEXTILE MANAGEMENT AND TEXTILE SCIENCE

Professors: J. R. Aspland, H. M. Behery, M. J. Drews, M. S. Ellison, B. C. Goswami, C. W. Jarvis, D. V. Rippey, C. D. Rogers, E. A. Vaughn; *Associate Professors:* R. V. Gregory, *Director:* O. F. Hunter, Sr., G. C. Lickfield

TEXT 175 Introduction to Textile Manufacturing 3(3,0) Introduction to the broad fields of textile, fiber, and polymer science and engineering with emphasis on the scientific, technological, and business principles utilized in producing fibers, yarns, and fabrics; enhancing fabric functionality by dyeing, finishing, and printing; and establishing end-use products.

TEXT 176 Natural and Man-made Fibers 4(3,3) Concept of natural and synthetic polymers as the raw materials of the textile industry is introduced. Survey of the origin, characteristics, and processing properties of various natural fibers and fiber-

forming synthetic polymers. Formation of textile fibers from polymeric materials is presented with specific emphasis on the polymer science and engineering principles.

TEXT 201 Yarn Structures and Formation 4(3,3) Study of fiber processing systems required to transform various fibrous materials into yarn. Involves the machine principles and theories, relationship of the fibers to the process and the resultant yarn structures, and subsequent analysis of the yarn structure to define quality and to determine suitable manufacturing practices. *Prq:* TEXT 175 and 176 or consent of instructor.

TEXT 202 Fabric Structures, Design, and Analysis 4(3,3) Study of fabric formation techniques designed to explore the principles and theories of modern technology. Evaluation and analysis of weaving, knitting, and nonwoven fabrication of textile structures. *Prq:* TEXT 201 or consent of instructor.

TEXT 301 Fiber Processing I 3(2,2) Study of fibrous materials and their relationships to the fiber processing systems. The objectives, theories, principles, and mechanisms of the machines used in the earlier stages of fiber processing. Directed primarily to the staple fiber processing systems. Mechanical and mathematical fundamentals are applied to the machines concerned.

TEXT 302 Fiber Processing II 3(2,2) Continuation of TEXT 301 emphasizing the later stages of fiber processing for the ultimate yarn strand. *Prq:* TEXT 301.

TEXT 308 Apparel 4(3,3) Introduction to apparel construction techniques and analysis of problems commonly encountered in the apparel industry. Evaluation of fabric design and properties. *Prq:* TEXT 202 or consent of instructor.

TEXT 311 Fabric Development I 3(2,2) Study of the basic theory of the cam loom weaving machine. The principles of designs of the basic plain, twill, and sateen fabric, and other weaves such as the honeycomb, the mock leno, and the huckaback weave. Weave analysis and preparation of necessary drafts are included.

TEXT 312 Fabric Development II 3(2,2) Study of the theory and operation of the dobby head, Knowles head, Staubi dobby, Jacquard head, and multicolor selection for the above looms. Weave design for compound fabrics using two or more systems of warp and filling threads for three-dimensional weaves, weave analysis, and preparation of drafts are covered. *Prq:* TEXT 311.

TEXT 314 Chemical Processing of Textiles 4(3,2) Concepts of current procedures in the chemical, mechanical and physical preparation, and in bleaching, dyeing, printing, and finishing of fabrics are presented; colorimetric and spectrophotometric methods of color control and test methods for the evaluation of the effectiveness of the treatments are emphasized. Not open to Textile Chemistry or Textile Management (Chemical) majors.

TEXT 324 Textile Statistics 3(3,0) Introduction to statistics with particular application to the textile industry. Measures of central value and variation, probability, the normal curve, tests of hypotheses, elementary correlation, and regression. *Prq:* Sophomore standing or consent of instructor.

TEXT 333 The Textile Arts 3(2,3) Survey of the development of the hand loom from prehistoric times to the present. Studio work in the elements of handwoven fabrics, their design, analysis and production of four-harness counterbalance and jack looms. *Prq:* Junior standing or consent of instructor.

TEXT 403 Fiber Processing III 3(2,2) Concepts of current fiber processing machines, techniques, practices, and their validity are investigated. Problems are assigned that require use of acquired knowledge, textile testing equipment, and processing machines. The relation of fibrous material properties and processing dynamics to the fiber assemblies produced is studied. *Prq:* TEXT 201 or 302.

TEXT 411 Fabric Development III 3(2,2) Study of specifications and loom details for the production of fabrics woven to the customer's order, including multicolor layouts. Warp and filling preparation are covered as well as size formulations and their methods of application. Warping and dressing plans are developed for the warper and the slasher. *Prq:* TEXT 202 or 312.

TEXT 414 Knitted Structures 3(3,0) Survey of knitted structures dealing with the principles and mechanisms involved. Various systems are covered with emphasis on fiber and yarn requirements and fabric properties.

TEXT 416 Nonwoven Structures 3(2,2) Nonwoven fabric structures, their manufacture, properties, and applications. Methods of nonwoven fabric formation, resultant material characteristics and end-use applications are examined. *Prq:* TEXT 201 or 301.

TEXT 421, H421, 621 Fiber Science 3(2,2) Familiarizes students with the physical properties of textile and high performance fibers and how these properties influence process and end-use performance; method of measuring those properties; and how those properties are related to structural features of the fiber.

TEXT 422, 622 Properties of Textile Structures 3(2,2) Yarn and fabric properties, their scientific significance and analysis. Dimensional, structural, and mechanical interrelationships are established and evaluated.

TEXT 426, 626 Instrumentation 3(3,0) Principles of industrial and process instrumentation and control as applied in the textile industry; static and dynamic characteristics of measurement devices; transducer principles and techniques of their application for measurement of physical properties such as pressure, temperature, flow, weight, etc.; principles of process controllers; applications of computers in textile process control.

TEXT 428 Textile Research 1-3 Investigation of a problem in textile, fiber, or polymer science under the direct supervision of a faculty member. After completing the research, student prepares a formal written report which is presented orally. *Prq:* Senior standing or consent of instructor.

TEXT 429 Textile Research 1-3 Continuation of TEXT 428.

TEXT 440 Color Science 3(2,3) Application of the science of color to industrial practice in textiles, plastics, paints, lighting, and ceramics. Laboratory work is performed on modern instruments and computers.

TEXT 460, 660 Textile Processes 3(3,0) Survey of machinery and processes of textile manufacturing from fiber formation through fabric finishing. For students with a nontextile background.

TEXT 470 Textile Costing and Inventory Control 3(3,0) Study of the principles of costing as they specifically apply to the manufacture of textiles. Allocation of cost of material, labor, and overhead; determining the unit cost of yarns, fabrics, and finishes. Inventory systems, storage, materials handling, and profiles. *Prq:* TEXT 202 or consent of instructor.

TEXT 471 Plant Layout and Processing Design 3(3,0) Survey of the essentials necessary for textile process implementation from the pilot plant concept to a functioning textile process facility. Consideration is given to material flow requirements, power requirements, machinery layout, environmental controls, and facility design. *Prq:* TEXT 202.

TEXT 472, 672 Textile International Trade 3(3,0) Analyzes the current structure of the international textile trade including imports, exports, tariffs, and trade requirements. Field experience with local firms is used to enhance the student's understanding. *Prq:* Senior standing or consent of instructor.

TEXT 475, 675 Textile Marketing 3(3,0) Examination of the activities involved in the distribution of textile products in today's market. Emphasis is placed on the role of consumer research and the analysis of fashion in the design and promotion of textile products.

TEXT 476, 676 Carpet Manufacturing 3(3,0) Study of the materials, manufacturing technologies, products, and practices associated with the carpet manufacturing sector of the textile industry. Raw materials, product design, formation and finishing systems, evaluation methods, distribution, and end-use applications are examined. *Prq:* TEXT 201, 202, or consent of instructor.

THEATRE

Professors: C. S. M. Egan, R. C. Sawyer, Associate Professor; D. J. Hartmann, Visiting Assistant Professor; L. M. Mercer, Research Associate/Lecturer; C. A. Collins

THEA 210, H210 Theatre Appreciation 3(3,0) Examination of the theatre event approached through historical context, play reading, analysis of production practices, and field trips to live dramatic performances.

THEA 267 Stage Makeup Techniques 3(2,1) Practical study of basic stage makeup techniques for the acting student including corrective makeup, modeling with paint, three-dimensional makeup, prostheses with latex, and makeup for other media.

THEA 279 Theatre Laboratory 1(0,3) Practical work in theatre on a production designed for public presentation. May be repeated for a maximum of four credits.

THEA 315 Theatre History I (3,0) Historical survey of Western theatre; emphasis is placed on the changing roles of the playwright, director, actor, technician, and spectator from antiquity to the Renaissance. *Prq:* Sophomore standing.

THEA 316 Theatre History II 3(3,0) Historical survey of Western theatre; emphasis is placed on the changing roles of the playwright, director, actor, technician, and spectator from the Renaissance to the present. *Prq:* Sophomore standing.

THEA 317 African American Theatre 3(3,0) Acquaints students with the origin and development of African American playwrights, plays, players, and their contributions to the American theatre from the 19th century to the present.

THEA (ENGL) 347 The Structure of Drama 3(3,0) Introduction to the creative writing and critical study of drama. *Prq:* Sophomore literature or consent of instructor.

THEA 368 Voice for the Stage 3(2,3) Study of the principles of vocal production and standard American speech for the stage; exercises in breath support and projection, improving tonal quality, and elimination of regional dialects through the study of the International Phonetic Alphabet. *Prq:* Sophomore standing.

THEA 372 Creative Drama 3(3,0) Practical applications using creative drama as a learning tool to strengthen curriculum goals and heighten student participation in the classroom. Students develop classroom teaching strategies based on drama education. Appropriate for elementary and secondary teachers, artists, and workshop leaders.

THEA 374 Stage Movement for Actors 3(1,2) Study of the psychological and physical sources of movement in the human body, with emphasis on the attainment of intellectual and physical control and the application of the skills to the development of a role.

THEA 375 Acting I 3(2,3) Fundamentals of acting, basic stage techniques; exercises in interpretation, improvisation, characterization; experience in supervised scene study.

THEA 376 Stage Directing I 3(2,3) Directing and staging techniques for the proscenium stage; exercises in composition, movement, picturization; experience in direction of scenes. *Prq:* Sophomore standing.

THEA 377 Stagecraft 3(2,3) Theory and practice of stage design and technology. *Prq:* Sophomore standing.

THEA 379 Acting Ensemble 1(0,3) Performance opportunities in the area of theatre for young audiences. Students are members of a theatrical touring troupe and perform in a variety of spaces and locations. May be repeated for a maximum of four credits. By audition only.

THEA 398 Special Topics in Theatre 3(3,0) Select areas of study in theatre not addressed by other theatre course offerings. May be repeated once. *Prq:* Consent of instructor.

THEA (ENGL) 447 Playwriting Workshop 3(0,3) Workshop in the creative writing of plays. May be repeated once. *Prq:* THEA (ENGL) 347.

THEA 472, 672 Improvisation: Interpreting and Developing Texts 3(3,0) Practical applications using drama as a learning tool to strengthen writing skills, motivate collaboration, heighten analytical skills. Students use improvisation to analyze texts and to revise original work, consider theory and research of contemporary scholars, and develop approaches to literature and composition

based on readings and drama experiences. *Preq:* Senior standing or consent of instructor.

THEA 476 Stage Directing II 3(2,3) Continued study in the art of stage directing, emphasizing leading contemporary theory and methodology. Culminates in the production of a one-act play for public presentation. *Preq:* THEA 376 or consent of instructor.

THEA 477 Stage Design 3(2,3) Study and practice in stage design, including drafting, graphics, drawing, rendering, scene painting, and light plotting. *Preq:* THEA 377 or consent of instructor.

THEA 479 Acting II 3(2,3) Continued study in the craft of acting for contemporary Western theatre. Students focus on monologue and scene study in a variety of performance settings. *Preq:* THEA 375 or consent of instructor.

THEA 487 Stage Lighting 3(2,1) Theory and practice of stage lighting through an understanding of various lighting instruments, lighting control systems, and execution of lighting designs.

THEA 497, 697 Scene Painting 3(2,1) Practical study of basic painting techniques for the theatre including layout, proper use of materials, painting styles, and texturing techniques.

THEA 499, 699 Independent Studies 1-3(1-3,0) Tutorial work for students with special interests outside the scope of existing courses. May be repeated for a maximum of six credits. *Preq:* Consent of department chair.

WILDLIFE AND FISHERIES

BIOLOGY

Professors: A. G. Eversole, T. T. Fendley, J. W. Foltz, D. L. Otis, T. E. Schwedler, J. R. Sweeney, Chair; J. R. Tomasso, Jr., G. W. Wood; *Associate Professors:* J. J. Isely, G. K. Yarrow; *Assistant Professor:* C. R. Allen

W F B 101 Introduction to Aquaculture, Fisheries, and Wildlife 1(1,0)F Informative sketch of aquaculture, fisheries science, and wildlife management. Students are introduced to principles, resources, professional organizations, and careers in these fields. *Preq:* Major in Wildlife and Fisheries Biology or consent of instructor.

W F B 102 Methods of Aquaculture, Fisheries, and Wildlife Biology 1(0,2)F Introduction to methodology used in aquaculture, fisheries science, and wildlife management. Students are introduced to terminology, techniques, laws, and legislations. Skills with dimensions, units, computations, and technical communications as applied to aquaculture, fisheries, and wildlife. Open only to Aquaculture, Fisheries, and Wildlife majors. *Coreq:* W F B 101.

W F B 306 Introduction to Wildlife Conservation 2(2,0)F,S Examines the fundamental thinking upon which modern conservation programs have been built.

W F B 307 Hunting and Wildlife Management 1(1,0)S Hunting techniques used to harvest renewable wildlife resources are examined with respect to their roles in sound management practices. The effects of selected hunting regulations on wild populations, safety, and ethics are discussed. *Preq:* Junior standing or consent of instructor.

W F B (BIOSC) 313 Conservation Biology 3(3,0) Study of the biological bases for the conservation of flora, fauna, and habitats. Biological factors that influence decision-making process are also addressed. *Preq:* One year of general biology or consent of instructor.

W F B 350 Principles of Fish and Wildlife Biology 3(3,0)F Introduction to principles of fisheries and wildlife biology on which sound management practices are based. Interrelationships of vertebrate and invertebrate biology, habitat, and population dynamics are covered. *Preq:* One year of general biology.

W F B 412, H412, 612 Wildlife Management 3(2,3)S Basic principles and general practices of wildlife management and conservation are covered. Major problems concerning the management of wildlife resources, with emphasis on upland game species. Laboratory work includes practical work on the Clemson University woodlands and field trips to several areas where wildlife management is being practiced.

W F B 414, 614 Wildlife Nutritional Ecology 3(3,0)S Concepts of how terrestrial wildlife obtains and utilizes energy and nutrients in wild ecosystems are taught. Energy and nutrient availability will be discussed in the ecological context of distribution, flow, and cycling in natural and modified foraging areas. Physiology of digestion is discussed for major homeotherms. *Preq:* FOR 415 or W F B 412.

W F B 416, 616 Fishery Biology 3(2,3)F Principles underlying freshwater fish production. Introduction to major groups of freshwater fishes and their habitats. Topics include identification, age and growth, fecundity, food habits, populations estimation, environmental evaluation, management practices, and fish culture. *Preq:* One year of introductory biology and Junior standing.

W F B 430, 630 Wildlife Conservation Policy 3(3,0)F Deals with the ecological rationale and management implications of public policy designed for the conservation of American wildlife resources. Emphasis is on managed-land issues. *Preq:* W F B 350 or permission of the instructor.

W F B 450, 650 Aquaculture 3(3,0) Basic aquacultural techniques applied to freshwater and marine organisms; past and present culture of fin-fishes and shellfishes around the world; principles underlying fish production; water quality, feeding, and nutrition as they influence production of cultured aquatic organisms. *Preq:* One year of general biology and Junior standing.

W F B 451, 651 Fish Hatchery Management 3(3,0)F Principles of fish hatchery management including hatchery design, water-quality management, fish-health monitoring, fry and fingerling production, genetics, and transport techniques. Hatchery management techniques for sport-fish enhancement and endangered species recovery programs are emphasized. *Preq:* One year of general chemistry and one year of general biology.

W F B 460, 660 Warmwater Fish Diseases 2(2,0) Study of diseases in warmwater fish including infectious and noninfectious processes. *Preq:* One year of general biology, Junior standing and consent of instructor.

W F B 462, H462, 662 Wetland Wildlife Biology 3(3,0)F Study of wetland wildlife habitats, emphasizing classification by physical, chemical, and biological characteristics; the importance of wetland habitat for management and production of wetland wildlife species. *Preq:* BIOL 103 and 104; or 110/111.

W F B 463 Directed Research in Aquaculture, Fisheries, and Wildlife Biology 1(0,3)F,S Research problems in selected areas of aquaculture, fisheries, or wildlife science to introduce the student to experimental design, research techniques, and presentation of research results. May be repeated for a maximum of three credits. *Preq:* Junior standing and consent of instructor.

W F B (ENT) 469, H469, 669 Aquatic Insects 3(1,6) See ENT 469.

W F B 490 Field Training in Aquaculture, Fisheries, and Wildlife 6(0,18)F,S Students, in an eight-to-ten-week program, have the opportunity to observe aquaculture, fisheries, or wildlife management. Students have supervised management responsibility. Total of 270 hours required. Must be prearranged at least two months in advance. To be taken Pass/Fail only. *Preq:* Senior standing in Fisheries and Wildlife Biology and consent of instructor.

W F B 493 Selected Topics 1-4(1-4,0)F,S Specialized topics which explore current areas of research and management in aquaculture, fisheries science, or wildlife management are examined in lecture/seminar format. May be repeated for credit. *Preq:* Junior standing and consent of instructor.

W F B 499 Wildlife Biology and Fisheries Seminar 1(1,0)F,S Exploration of current literature and research in fisheries and wildlife sciences. Students participate in the analysis of research findings, utilizing skills acquired in their undergraduate programs. May be repeated once for credit.

WOMEN'S STUDIES

Professor: J. M. Melton; *Associate Professor:* B. Daniell; *Assistant Professors:* S. M. Sinke, E. K. Sparks

W S 301 Introduction to Women's Studies: Women's Lives 3(3,0) Interdisciplinary course exploring the unique features of women's lives from childhood to old age. Content is based on new research in many disciplines, including psychology, sociology, history, literature, and the arts. *Preq:* Sophomore standing.

W S 459, 659 Selected Topics in Women's Studies 1-3(1-3,0) Topics change from semester to semester and are announced prior to registration. May be repeated for a maximum of six credits, but only if different topics are covered.

W S 498 Advanced Studies in Women's Studies 3(3,0) Focuses on the theoretical foundations for women's studies, with particular emphasis on how women's studies research and theory influence institutions and governmental policies. Readings include essays on such central women's studies issues as work, family, children, health care, legislation, and government policies. *Preq:* W S 301 or consent of instructor.

FACULTY

- Aadland, Rolf Konrad**, *Adjunct Associate Professor of Geological Sciences*. BS, University of Houston, 1964; MS, University Nebraska, 1967; PhD, University of Idaho, 1980
- Abbott, Albert Glenn**, *Associate Professor of Biochemistry*. BS, University of Connecticut, 1976; PhD, Brown University, 1980
- Abramovitch, Rudolph Abraham**, *Professor of Chemistry*. BS, Alexandria University, 1950; PhD, King's College, 1953; DSc, University of London, 1964
- Acres, George Steven**, *Adjunct Assistant Professor of Bioengineering*. BS, Purdue University, 1973; MD, Indiana University School of Medicine, 1977
- Acton, James Crockett**, *Stender Professor of Food Science*. BS, 1965, PhD, 1970, University of Georgia
- Adams, Carol A.**, *Assistant Professor of Animal and Veterinary Sciences*. BS, 1988, DVM, DPVM, 1993, University of California-Davis
- Adams, Clementina Rodriguez**, *Associate Professor of Spanish*. BA, Atlantic University (Colombia), 1969; MS, 1974, PhD, 1984, Florida State University
- Adams, Minerva Rios**, *Lecturer in Mathematical Sciences*. BS, University of Puerto Rico, 1978; MS, Virginia Polytechnic Institute and State University, 1982
- Adams, Warren Philip**, *Professor of Mathematical Sciences*. BS, Lewis University, 1979; MS, 1981, PhD, 1984, Virginia Polytechnic Institute and State University
- Adelberg, Jeffrey William**, *Assistant Professor/Research Associate of Horticulture*. BS, 1982, MS, 1987, Rutgers University; PhD, Clemson University, 1993
- Adler, Peter Holdridge**, *Professor of Entomology*. BS, Washington and Lee University, 1976; MS, 1979, PhD, 1983, Pennsylvania State University
- Ahzi, Said**, *Assistant Professor of Mechanical Engineering*. BS, 1983, MS, 1984, PhD, 1987, University of Metz (France)
- Aitken, James Bruce**, *Professor of Horticulture*. Sandhill Research and Education Center. BS, 1962, MS, 1964, Clemson University; PhD, University of Florida, 1967
- Alberts, James Joseph**, *Adjunct Professor of Zoology*. BA, Cornell College, 1965; MS, Dartmouth College, 1967; PhD, Florida State University, 1970
- Albrecht, John Ernest**, *Professor of Animal Science*. *Pee Dee Research and Education Center*. BS, Delaware Valley College, 1965; MS, 1968, PhD, 1971, North Carolina State University
- Alexander, John Calvin, Jr.**, *Brazelton Professor of Financial Planning; Associate Professor of Finance*. BBA, 1984, MBA, 1985, Stetson University; PhD, Florida State University, 1991
- Allen, Benjamin Louis, Jr.**, *Adjunct Professor, GHS/CU Biomedical Cooperative; Chief of Staff, Greenville Unit, Greenville Hospital System*. BS, Wofford College, 1960; MD, Duke University, 1964
- Allen, Craig Reece**, *Assistant Leader of South Carolina Cooperative Fish and Wildlife Research Unit; Assistant Professor of Wildlife and Fisheries Biology*. BS, University of Wisconsin, 1989; MS, Texas Tech University, 1993; PhD, University of Florida, 1997
- Allen, Lawrence Robert**, *Associate Dean, College of Health, Education, and Human Development; Professor of Parks, Recreation, and Tourism Management*. BS, West Chester State University, 1970; MS, 1974, PhD, 1979, University of Maryland
- Allen, William Harold**, *Professor of Agricultural and Biological Engineering*. BS, 1966, MS, 1969, Clemson University; PhD, University of Tennessee, 1972; PE
- Alley, Pamela R.**, *Visiting Assistant Professor of Psychology*. BA, 1975, MA, 1978, PhD, 1983, University of Connecticut
- Alley, Thomas Robertson**, *Professor of Psychology*. BA, BS, Pennsylvania State University, 1975; MA, 1979, PhD, 1981, University of Connecticut
- Allison, David John**, *Associate Professor of Architecture*. BS, 1978, MArch, 1982, Clemson University
- Alverson, David Roy**, *Professor of Entomology*. BS, 1968, MS, 1976, Clemson University; PhD, University of Georgia, 1979
- Amirkhanian, Serji**, *Professor of Civil Engineering*. BS, 1979, MS, 1981, Tennessee Technological University; PhD, Clemson University, 1987
- An, Yuehui Huey**, *Adjunct Assistant Professor of Bioprocessing*. BM, Harbin Medical University School of Medicine (China), 1983; MM, Beijing Medical University Graduate School (China), 1986
- Anand, Subhash Chandra**, *Professor of Civil Engineering*. BS, Banaras Hindu University (India), 1955; MS, 1965, PhD, 1968, Northwestern University; PE
- Anand, Vera Barata**, *Professor of Engineering Graphics*. BS, University of Para (Brazil), 1961; MS, Northwestern University, 1966
- Anderson, David Paul**, *Adjunct Professor of Chemical Engineering*. BA, Clemson University, 1973; MS, 1977, PhD, 1981, University of Massachusetts
- Anderson, Vicki Truluck**, *Adjunct Assistant Professor of Medical Technology*. *McLeod Regional Medical Center*. BS, University of Tampa, 1972
- Andreas, James Robert**, *Professor of English*. BA, Northwestern University, 1965; MA, The Johns Hopkins University, 1966; PhD, Vanderbilt University, 1973
- Appling, Jeffrey Robert**, *Associate Professor of Chemistry*. BS, 1980, PhD, 1985, Georgia Institute of Technology
- Arbena, Joseph Luther**, *Professor of History*. BA, George Washington University, 1961; PhD, University of Virginia, 1970
- Arlauckas, Regina Celeste**, *Visiting Instructor of Japanese*. BA, Clemson University, 1990; MA, Ohio State University, 1995
- Arnett, James D.**, *Adjunct Professor of Plant Pathology and Physiology*. BS, 1964, MS, 1966, University of South Carolina; PhD, Clemson University, 1971
- Arnold, Edwin Pratte**, *Associate Professor of German*. BA, University of South Carolina, 1958; MA, Kent State University, 1968
- Ashton, Susanna Margaret**, *Assistant Professor of English*. BA, Vassar College, 1989; MA, 1993, PhD, 1998, University of Iowa
- Askew, George Robert, Jr.**, *Professor of Forest Resources; Director of Belle W. Baruch Forest Science Institute*. BS, 1976, MS, 1978, PhD, 1981, Clemson University
- Aspland, John Richard**, *Professor of Textiles*. BS, 1958, MS, 1960, Leeds University; PhD, Manchester University, 1964
- Astle, Deana Lee**, *Assistant Dean of Libraries; Librarian*. BA, Brown University, 1967; MLS, University of California, 1968; MA, University of Utah, 1976
- Atiz, Nadim Mahmoud**, *Professor of Civil Engineering*. BSCE, 1978, MS, 1980, PhD, 1984, University of Mississippi
- Babel, Deborah Byrne**, *Department Head of Libraries; Associate Librarian*. BA, Wells College, 1968; MLS, University of North Carolina, 1976; MBA, Western Washington University, 1989
- Backman, Kenneth Frank**, *Assistant Professor of Parks, Recreation, and Tourism Management; Research Associate, Strom Thurmond Institute*. BS, Acadia University (Canada), 1980; MUP, 1985, PhD, 1989, Texas A&M University
- Backman, Sheila Jane**, *Associate Professor of Parks, Recreation, and Tourism Management*. BSC, 1977, MR, 1979, Acadia University (Canada); PhD, Texas A&M University, 1988
- Badr, Abdel Wahed**, *Adjunct Assistant Professor of Biosystems Engineering*. BS, Alexandria University (Egypt), 1968; MS, 1978, PhD, 1983, North Carolina State University
- Bailey, John Michael**, *Instructor of English*. BA, 1992, MA, 1994, Clemson University
- Baillie, Eugene E.**, *Adjunct Professor of Biochemistry/Medical Technology*. BS, University of Nebraska, 1963; MD, University of Nebraska College of Medicine, 1967
- Bainbridge, Robert Warin**, *Lecturer in Planning and Landscape Architecture*. BArch, University of California-Berkeley, 1970; MArch, Rice University, 1978
- Baird, William Vance**, *Associate Professor of Horticulture*. BS, Oregon State University, 1976; MA, Miami University, 1979; PhD, University of Virginia, 1983
- Balakrishnan, Nagraj**, *Associate Professor of Management*. BE, University of Madras, 1981; MS, University of Kentucky, 1983; PhD, Purdue University, 1987
- Balch, Clarence Almus**, *Lecturer in Engineering Graphics*. BS, California Polytechnic State University, 1959
- Ballard, Robert Edward**, *Professor of Botany*. BS, 1966, MA, 1968, Miami University; PhD, University of Iowa, 1975
- Ballato, John Michael**, *Assistant Professor of Ceramic and Materials Engineering*. BS, 1993, MS, 1995, PhD, 1997, Rutgers University
- Barczewski, Stephanie Lynn**, *Assistant Professor of History*. BA, Columbia University, 1990; MA, 1991, MPhil, 1993, PhD, 1996, Yale University
- Barcroft, Susan Ferguson**, *Director, School of Applied Science and Agricultural Business*. BS, 1971, MS, 1979, PhD, 1985, North Carolina State University
- Barfield, Rayford Elliott, Jr.**, *Professor of English*. BA, LaGrange College, 1961; MA, University of Georgia, 1963; PhD, University of Tennessee, 1969
- Barger, Jefferson Davis III**, *Adjunct Assistant Professor of Biosystems Engineering*. BS, North Georgia College, 1969; MS, 1972, PhD, 1989, Clemson University
- Barker, James Frazier**, *Dean, College of Architecture, Arts, and Humanities; Professor of Architecture*. BArch, Clemson University, 1970; MArch, Washington University, 1973; AIA
- Barkley, David Lane**, *Professor of Agricultural and Applied Economics*. BA, Furman University, 1969; MA, University of Georgia, 1972; PhD, Iowa State University, 1976
- Barmore, Charles Rice**, *Adjunct Professor of Food Science and Packaging Science*. BS, Clemson University, 1966; MS, 1969, PhD, 1972, University of Florida
- Barrett, David Elm**, *Professor of Educational Foundations*. BA, Wesleyan University, 1969; MS, 1973, PhD, 1974, University of Southern California
- Barron, Charles Henson, Jr.**, *Professor of Chemical Engineering*. BS, Clemson University, 1959; DSc, University of Virginia, 1963
- Barron, Felix Hector**, *Associate Professor of Food Science and Packaging Science*. BS, University of Chihuahua (Mexico), 1972; MS, University of Rome (Italy), 1975; MS, Washington State University, 1982; PhD, Michigan State University, 1990
- Bates, William G.**, *Biomedical Professor, GHS/CU Biomedical Cooperative; Principle Care, Inc.* BS, 1962, MD, 1965, University of North Carolina
- Bauer, Larry Lee**, *Professor of Agricultural and Applied Economics*. BS, University of Illinois, 1961; MS, Purdue University, 1963; PhD, North Carolina State University, 1968
- Bauer, Philip**, *Adjunct Assistant Professor of Crop and Soil Environmental Science*. BS, 1979, BS, 1982, MS, 1985, University of Wisconsin; PhD, Texas A&M University, 1988
- Baun, Carl William**, *Associate Professor of Electrical and Computer Engineering*. BS, University of California, 1987; MS, 1989, PhD, 1992, University of Illinois

- Bausman, Dennis Charles**, *Lecturer in Construction Science and Management*. BS, Iowa State University, 1971; MCSM, Clemson University, 1995
- Bautista, Gloria**, *Professor of Spanish*. BA, Javeriana University (Colombia), 1972; MA, 1975, PhD, 1987, State University of New York
- Baxa, Ernest Granville, Jr.**, *Associate Professor of Electrical and Computer Engineering*. BEE, University of Virginia, 1962; MSEE, 1968, PhD, 1970, Duke University
- Beasley, Donald Erwin**, *Professor of Mechanical Engineering*. BS, 1978, MS, 1980, Clemson University; PhD, University of Michigan, 1983
- Beattie, Robert J.**, *Biomedical Professor, GHS/UC Biomedical Cooperative; Director, Animal Resource Facility, University of South Carolina*. BS, 1962, DVM, 1964, Kansas State University
- Bechtel, Deborah Ann**, *Assistant Professor in School of Nursing*. BSN, Radford University, 1982; MS, University of Delaware, 1985; PhD, University of Texas, 1993
- Becker, Robert Henry**, *Director, Strom Thurmond Institute; Professor of Parks, Recreation, and Tourism Management*. BS, Pennsylvania State University, 1970; MA, 1973, PhD, 1976, University of Maryland
- Beckwith, William Frederick**, *Director of General Engineering; Professor of Chemical Engineering*. BS, 1957, MS, 1961, PhD, 1966, Iowa State University; PE
- Bedard, David Matthew**, *Assistant Professor of Military Science*. CPT, U.S. Army; BA, University of New Hampshire, 1991
- Bednar, John Clay**, *Coordinator, Language and International Trade Program; Associate Professor of French*. BA, Princeton University, 1965; Doctorat d'université, University of Besancon (France), 1969
- Behery, Hassan Mohamad**, *Professor of Textiles*. BS, 1950, MS, 1955, Alexandria University; PhD, University of Manchester, 1959; CText; FTI
- Belcher, Cynthia Leahy**, *Assistant Professor in School of Nursing*. BSN, University of Miami, 1969; MN, Emory University, 1971
- Bell, Lansford Charles, S. E.**, *Liles Distinguished Professor of Construction Engineering*. BS, 1965, MS, 1968, University of Maryland; PhD, Vanderbilt University, 1972; PE
- Bellinger, Robert Glenn**, *Extension Associate/Associate Professor of Entomology*. BS, 1974, MS, 1979, University of Maryland; PhD, Virginia Polytechnic Institute and State University, 1985
- Benjamin, Daniel Kelly**, *Professor of Economics*. BA, University of Virginia, 1969; MA, 1971, PhD, 1975, University of California-Los Angeles
- Bennett, Alma**, *Associate Professor of English and Humanities*. BM, Belhaven College, 1962; MS, Radford University, 1974; PhD, University of Texas, 1991
- Benson, Eric Peter**, *Associate Professor of Entomology*. BS, University of Vermont, 1979; MS, Fairleigh Dickinson University, 1984; PhD, Clemson University, 1988
- Berger, Sondra H.**, *Adjunct Professor, GHS/UC Biomedical Cooperative*. BS, McNeese State University, 1971; MS, Purdue University, 1975; PhD, State University of New York-Buffalo, 1982
- Bertrand, Jean Ann**, *Associate Professor of Animal and Veterinary Sciences*. BS, University of Missouri, 1980; MS, Iowa State University, 1983; PhD, University of Georgia, 1987
- Bertsch, Paul Michael**, *Adjunct Professor of Environmental Engineering and Science*. BS, University of Connecticut, 1978; MS, Virginia Polytechnic Institute and State University, 1980; PhD, University of Kentucky, 1983
- Beyerlein, Adolph Louis**, *Chair and Professor of Chemistry*. Adjunct Professor, GHS/UC Biomedical Cooperative. BS, Fort Hays Kansas State College, 1960; PhD, University of Kansas, 1966
- Biggers, Sherrill Bost**, *Professor of Mechanical Engineering and Engineering Mechanics*. BSCE, North Carolina State University, 1966; MS, 1970, PhD, 1971, Duke University; PE
- Biggers, Sherry Smith**, *Lecturer in Mathematical Sciences*. BS, Auburn University, 1968; MAT, Duke University, 1971; MS, University of Kentucky, 1973
- Birenkott, Glenn Peter, Jr.**, *Professor of Poultry Science*. BS, 1973, MS, 1975, PhD, 1978, University of Wisconsin
- Bishop, Carl Olen**, *Instructor of Speech*. BA, 1996, MA, 1997, Duquesne University
- Bixler, Robert Dike**, *Assistant Professor of Parks, Recreation, and Tourism Management*. BA, 1981, MA, 1986, University of Louisville; PhD, Clemson University, 1994
- Blackbourn, Richard Lee**, *Professor of Educational Leadership*. BS, 1974, MS, 1976, EdD, 1983, Mississippi State University
- Blair, Dudley Wayne**, *Acting Associate Dean and Director of Master of Business Administration Program; Professor of Economics*. BS, 1970, PhD, 1975, Texas A&M University
- Blalock, Joseph Charles, Jr.**, *Lecturer in Landscape Architecture*. BLA, SUNY College, 1992; MS, Pratt Institute, 1995
- Blendulf, Bengt R. W.**, *Adjunct Lecturer in Mechanical Engineering*. BS, NKI Institute (Sweden), 1961
- Bleser, Carol**, *Calhoun and Kathryn Lemon Professor of History*. BA, Converse College, 1960; MA, 1961, PhD, 1966, Columbia University
- Blumer, Nancy Adkins**, *Lecturer in Nursing*. BS, University of South Carolina, 1977; PharmD, Medical University of South Carolina, 1980
- Bodenheimer, Lisa**, *Associate Librarian*. BA, Mercer University, 1980; MAT, Vanderbilt University, 1983; MLS, Indiana University, 1986
- Bodine, Ashby Burgess II**, *Professor of Animal and Veterinary Sciences*. BA, 1969, MS, 1975, PhD, 1978, Clemson University
- Boese, Christine Beth**, *Assistant Professor of English*. BA, University of Wisconsin, 1985; MFA, University of Arkansas, 1990; PhD, Rensselaer Polytechnic Institute, 1998
- Bokar, Jason Charles**, *Assistant Professor of Mechanical Engineering*. BS, 1986, MS, 1989, University of Akron; PhD, North Carolina State University, 1995
- Boone, William R.**, *Adjunct Associate Professor of Animal Physiology; Biomedical Associate Professor, GHS/UC Biomedical Cooperative; Director of Assisted Reproductive Technology and Andrology Laboratories, Greenville Hospital System*. AS, Abraham Baldwin Agricultural College, 1968; BS, University of Georgia, 1970; MS, 1972, PhD, 1977, Clemson University
- Boring, Toby Matthew**, *Lecturer in Agricultural and Applied Economics*. BS, 1977, MS, 1982, University of Tennessee
- Botchway, Portia Anita**, *Lecturer in School of Nursing*. BSN, Hampton Institute, 1975; MS, University of Maryland, 1979
- Boufadel, Michel Chahine**, *Research Associate/Assistant Professor of Environmental Engineering and Science*. BS, Jesuit University (Lebanon), 1988; MS, 1992, PhD, 1998, University of Cincinnati
- Bowen, Craig William**, *Visiting Assistant Professor of Chemistry*. BS, Emory University, 1985; MS, 1988, MS, 1989, Purdue University; PhD, Florida State University, 1993
- Bowker, J. Michael**, *Adjunct Professor of Forest Resources*. BA, Bates College, 1976; PhD, Texas A&M University, 1987
- Bowman, Larry Stanley**, *Adjunct Professor of Bioengineering*. BA, West Virginia University, 1969; MS, Clemson University, 1971; MD, Medical University of South Carolina, 1974
- Box, Benton Holcomb**, *Executive Director, University Center; Professor of Forest Resources*. BS, 1957, MF, 1959, Louisiana State University; DF, Duke University, 1967
- Boyer, Magalie Paul**, *Instructor of English and French*. BA, Agnes Scott College, 1985; MA, Middlebury College, 1987; MA, Clemson University, 1996
- Boykin, Joseph Floyd, Jr.**, *Dean of Libraries; Librarian*. BS, 1962, MS, 1965, Florida State University
- Bradford, Garnett Lowell**, *Professor of Agricultural and Applied Economics*. BS, 1957, MS, 1959, University of Kentucky; PhD, North Carolina State University, 1968
- Bradshaw, David Winstead**, *Professor of Horticulture*. BS, 1968, MS, 1973, North Carolina State University; PhD, Virginia Polytechnic Institute and State University, 1977
- Brainerd, Edwin Grenier, Jr.**, *Associate Professor of Psychology*. BA, Washington College, 1968; MA, 1971, PhD, 1974, West Virginia University
- Brame, Scott Eppes**, *Research Associate/Assistant Professor of Geological Sciences*. BS, New Mexico Institute of Mining and Technology, 1983; MS, Clemson University, 1993
- Brannan, James Richard**, *Professor of Mathematical Sciences*. BS, 1973, MS, 1976, Utah State University; PhD, Rensselaer Polytechnic Institute, 1979
- Brawley, Joel Vincent, Jr.**, *Alumni Distinguished Professor of Mathematics; Professor of Curriculum and Instruction*. BS, 1960, MS, 1962, PhD, 1964, North Carolina State University
- Bridges, William Carroll, Jr.**, *Professor of Experimental Statistics*. BS, University of North Carolina, 1980; MS, 1982, PhD, 1984, University of Nebraska
- Bridgwood, Joan**, *Lecturer in Russian*. BA, University of Leeds, 1967; MA, Middlebury College, 1989
- Bridgwood, Michael Andrew**, *Associate Professor of Electrical and Computer Engineering*. BSC, Leeds University, 1968; MSC, 1975, PhD, 1979, Portsmouth Polytechnic Institute
- Briggs, Diane Eaton**, *Lecturer in Mathematical Sciences*. BS, 1985, MS, 1998, Clemson University
- Brigmon, Robin L.**, *Adjunct Assistant Professor of Environmental Engineering and Science*. BS, 1979, MS, 1987, PhD, 1992, University of Florida
- Brislin, I. Lehr, Jr.**, *Adjunct Associate Professor of Wildlife*. BA, Wesleyan University, 1962; MS, 1965, PhD, 1967, University of Georgia
- Brogdon, William Gail**, *Adjunct Professor of Entomology*. BS, Georgia State University, 1970; MS, 1970, PhD, 1981, University of Georgia
- Brooks, Afton DeWayne**, *Professor of Curriculum and Instruction*. BA, Carson-Newman College, 1963; MEd, Middle Tennessee State University, 1967; EdD, University of Georgia, 1972
- Brooks, Kerry Rand**, *Associate Professor of Planning*. BA, Western Washington University, 1972; MUP, 1983, PhD, 1991, University of Washington
- Brosnan, Denis Albert**, *Director, Ceramic Center; Professor of Ceramic and Materials Engineering*. MS, Clemson University, 1968; PhD, Iowa State University, 1972; PE
- Brown, Carolyn Scurry**, *Professor of Biochemistry*. BA, Winthrop College, 1964; PhD, Vanderbilt University, 1969
- Brown, Karen Miller**, *Lecturer in School of Nursing*. BS, Alverno College, 1967; MS, Clemson University, 1980
- Brown, Lisa Shirley**, *Visiting Assistant Professor of Reading Education*. BA, Central Wesleyan College, 1976; MEd, Clemson University, 1994
- Brown-Pressly, Laurie Ruth**, *Instructor of English*. BA, Lander University, 1994; MA, Clemson University, 1997
- Brown, Richard Bertram**, *Associate Chemist, Agricultural Chemical Services; Lecturer in Food Science*. BS, St. Francis College, 1968; MS, Old Dominion University, 1975; PhD, Clemson University, 1981
- Brown, Russell Henry***, *Professor of Civil Engineering and Engineering Mechanics*. BS, University of Houston, 1966; PhD, Rice University, 1970; PE

- Brown, Thomas Miller**, *Professor of Entomology*. BS, Adrian College, 1970; MS, 1971, PhD, 1973, Michigan State University
- Bruce, David Alan**, *Assistant Professor of Chemical Engineering*. BS, 1991, MS, 1992, PhD, 1994, Georgia Institute of Technology
- Brune, David Edward**, *Professor of Agricultural and Biological Engineering*. BS, 1974, MS, 1975, PhD, 1978, University of Missouri; PE
- Bryan, Edward Lewis**, *Professor of Accounting*. BS, U.S. Naval Academy, 1961; MS, 1966, DBA, 1980, George Washington University; CPA
- Bryant, Hallman Bell**, *Professor of English*. BA, Emory University, 1959; MA, University of North Carolina, 1962; PhD, Vanderbilt University, 1968
- Bryant, Robert George**, *Adjunct Professor of Ceramic and Materials Engineering*. BS, Valparaiso University, 1985; MS, 1990, PhD, 1995, University of Akron
- Buckley, John Dennis**, *Adjunct Professor of Ceramic and Materials Engineering*. BS, St. Lawrence University, 1950; BS, 1959, MS, 1961, Clemson University; PhD, Iowa State University, 1968
- Budberg, Steven Craig**, *Visiting Professor of Bioengineering*. BS, 1980, DVM, 1983, MS, 1983, Washington State University
- Burati, James Louis**, *Professor of Civil Engineering*. BS, Virginia Polytechnic Institute and State University, 1974; MS, Ohio State University, 1975; PhD, Pennsylvania State University, 1984
- Burnett, Wesley**, *Professor of Parks, Recreation, and Tourism Management and Geography*. BA, Southern Methodist University, 1966; MSLS, Our Lady of the Lake University, 1970; MA, 1974, PhD, 1976, University of Oklahoma; FRGS
- Burns, Alan C.**, *Assistant Librarian*. BS, Weber State University, 1994; MA, Indiana University, 1996; MA, Indiana University-Purdue University, 1996
- Burns, James William**, *Adjunct Assistant Professor of Bioengineering*. BS, Purdue University, 1977; MS, 1981, PhD, 1984, University of Illinois
- Burrows, Peter Michael**, *Professor of Experimental Statistics*. BSc, University of Manchester (England), 1960; PhD, North Carolina State University, 1971
- Burt, Philip Barnes**, *Professor of Physics*. BA, 1956, MS, 1958, PhD, 1961, University of Tennessee
- Burton, Joseph Arnold**, *Associate Professor of Architecture*. BS, 1971, BArch, 1973, MArch, 1975, University of Texas; PhD, University of Pennsylvania, 1983
- Busscher, Warren John**, *Adjunct Associate Professor of Crop and Soil Environmental Science*. BS, Loyola University, 1967; MS, 1970, PhD, 1976, Pennsylvania State University
- Butler, Chalmers McNair**, *Professor of Electrical and Computer Engineering*. BS, 1957, MS, 1959, Clemson University; PhD, University of Wisconsin, 1962
- Butler, John Kenrick, Jr.**, *Professor of Management*. BS, Brown University, 1963; MBA, Michigan State University, 1970; DBA, Florida State University, 1977
- Buyer, Paul Lorin**, *Instructor of Music*. BS, Ball State University, 1992; MM, University of Arizona, 1994
- Buzzell, Ward Vernon**, *Adjunct Professor of Architecture*. BS, Clemson University, 1953
- Byl, Thomas Duane**, *Visiting Assistant Professor of Environmental Toxicology*. BA, Hope College, 1983; MS, Louisiana State University, 1986; PhD, Memphis State University, 1992
- Bzdy, Donald Gregory**, *Associate Professor of English*. BA, University of Miami, 1970; MA, 1971, PhD, 1977, University of Illinois
- Caban, Jose Rafael**, *Chair of School of Architecture; Professor of Architecture and Planning and Landscape Architecture*. BArch, Clemson University, 1967; MCD, University of Liverpool, 1971; AIA, APA
- Cain, Margaret Wright**, *Visiting Assistant Professor of Geological Sciences*. BS, University of South Carolina, 1949
- Caldwell, Erik Robert**, *Visiting Instructor of Geological Sciences*. BA, Albion College, 1992; MS, Clemson University, 1995
- Caldwell, Judith Dawn**, *Associate Professor of Horticulture*. BS, 1975, MS, 1977, Virginia Polytechnic Institute and State University; PhD, University of Arkansas, 1980
- Calkin, Neil James**, *Assistant Professor of Mathematical Sciences*. MA, Cambridge University (United Kingdom), 1986; PhD, University of Waterloo (Canada), 1988
- Calvez, Daniel Jean**, *Associate Professor of French*. Lettres, Angers University (France), 1965; PhD, University of Georgia, 1980
- Camberato, James John**, *Associate Professor of Crop and Soil Environmental Science*. BS, University of Massachusetts, 1980; MS, 1982, PhD, 1987, North Carolina State University
- Camp, Carl Rosser, Jr.**, *Adjunct Associate Professor of Biosystems Engineering*. BS, 1958, MS, 1967, Auburn University; PhD, North Carolina State University, 1969
- Campbell, Robert L.**, *Professor of Psychology*. BA, Harvard University, 1974; PhD, University of Texas, 1986
- Camper, Nyal Dwight**, *Professor of Plant Pathology and Physiology, Botany, and Microbiology*. BS, 1962, PhD, 1966, North Carolina State University
- Cantrell, H. Furman**, *Adjunct Research Professor of Molecular Medicine; Adjunct Professor, GHSC/UC Biomedical Cooperative*. BS, Furman University, 1961; MSPH, University of North Carolina, 1967; PhD, Clemson University, 1970
- Cantrell, Rayford Stephen**, *Professor of Management and Economics*. BS, University of Alabama, 1972; MS, University of Kentucky, 1974; PhD, North Carolina State University, 1982
- Carlson, Les**, *Professor of Marketing*. BA, Midland Lutheran College, 1973; MA, 1980, PhD, 1985, University of Nebraska
- Carner, Gerald Roy**, *Professor of Entomology*. BA, Asbury College, 1964; MS, 1966, PhD, 1969, Auburn University
- Carney, Elizabeth Donnelly**, *Associate Professor of History*. BA, Smith College, 1969; MA, 1973, PhD, 1975, Duke University
- Carpenter, Cathy Jo**, *Visiting Instructor of Chemistry*. BA, Columbia College, 1995
- Carr, Rebecca Lamb**, *Assistant Professor in School of Nursing*. BSN, 1977, MSN, 1983, PhD, 1977, Medical College of Georgia
- Carroll, David Loren**, *Assistant Professor of Physics and Astronomy*. BS, North Carolina State University, 1985; PhD, Wesleyan University, 1993
- Carter, George Emmitt, Jr.**, *Director, Undergraduate Academic Services; Professor of Plant Pathology and Physiology*. BS, 1968, MA, 1970, Wake Forest University; PhD, Clemson University, 1973
- Carter, Randall Mark**, *Lecturer in Graphic Communications*. BS, Clemson University, 1996
- Case, Edward Leo**, *Visiting Instructor of Chemistry*. BS, 1990, MS, 1998, Clemson University
- Cash, Luther Stephen**, *Professor of Accounting*. BS, 1963, JD, 1968, University of Tennessee; LL.M., Washington University, 1972; CPA
- Cason, Katherine Lynn**, *Associate Professor of Food Science and Human Nutrition*. BS, Pennsylvania State University, 1981; MS, Texas Woman's College, 1985; PhD, Virginia Polytechnic Institute and State University, 1988
- Castle, James Walter**, *Assistant Professor of Geological Sciences*. BS, Allegheny College, 1972; MS, University of Wisconsin, 1974; PhD, University of Illinois, 1978
- Catalana, Paul Vincent**, *Adjunct Associate Professor of Microbiology*. BS, Bates College, 1975; MD, State University of New York-Stony Brook, 1979; MPH, University of Pittsburgh, 1987
- Cawthon, Tony**, *Assistant Professor of Counseling*. BA, 1981, MA, 1983, University of Tennessee; PhD, Mississippi State University, 1995
- Chamberlain, Frances Fotini**, *Associate Professor of Landscape Architecture*. BA, University of Texas, 1970; MLA, University of Virginia, 1980
- Chang, Catherine Y.**, *Assistant Professor of Counseling*. BA, Davidson College, 1991; MA, 1995, PhD, 1998, University of North Carolina-Greensboro
- Chapin, Jay Willard**, *Professor of Entomology, Edisto Research and Education Center*. BS, Dickens College, 1970; MA, East Carolina University, 1975; PhD, Clemson University, 1978
- Chapman, Stephen Richard**, *Professor of Crop and Soil Environmental Science*. BS, 1959, MS, 1963, PhD, 1966, University of California
- Chapman, Wayne Kenneth**, *Associate Professor of English*. BS, 1972, MA, 1977, Portland State University; PhD, Washington State University, 1988
- Charney, Mark Jay**, *Associate Professor of English*. BA, Clemson University, 1978; MA, University of New Orleans, 1980; PhD, Tulane University, 1987
- Chastain, John Perkins**, *Assistant Professor of Bioreystems Engineering*. BS, University of Georgia, 1982; MS, 1987, PhD, 1991, University of Kentucky; EIT
- Chavez, Carmen Lucrecia**, *Assistant Professor of Spanish*. BA, Converse College, 1977; MA, Middlebury College, 1979; PhD, University of Virginia, 1995
- Cheatham, Harold Ernest**, *Dean, College of Health, Education, and Human Development; Professor of Counseling and Education Leadership*. BS, Pennsylvania State, 1961; MA, Colgate University, 1969; PhD, Case Western Reserve University, 1973
- Chen, Sean S.**, *Assistant Professor of Accounting*. BBA, 1976, MEd, 1979, National Taiwan University; MBA, Youngstown State University, 1985; PhD, University of Pittsburgh, 1992
- Chen, Wei**, *Adjunct Assistant Professor of Mechanical Engineering*. BS, Shanghai Jiao Tong University (People's Republic of China), 1984; MS, University of Houston, 1990; PhD, Georgia Institute of Technology, 1995
- Chen, Wen-yuan**, *Assistant Professor of Molecular Medicine*. DDS, Shanghai Second Medical University, 1982; MS, 1987, PhD, 1991, Ohio University
- Cho, Byung-Rae**, *Assistant Professor of Industrial Engineering*. BS, Kyung Hee University (Korea), 1982; MS, Ohio State University, 1985; PhD, University of Oklahoma, 1994
- Cholewinski, Frank Michael**, *Professor of Mathematical Sciences*. EP, 1958, MS, 1959, Auburn University; PhD, Washington University, 1964
- Christenbury, Gerald Davis**, *Professor of Bioreystems Engineering*. BS, North Carolina State University, 1964; MS, Clemson University, 1966; PhD, Iowa State University, 1975; PE
- Christenbury, Joyce Hvrol**, *Professor of Family and Youth Development*. BS, Winthrop College, 1962; MEd, University of North Carolina, 1970
- Christensen, Robert Wayne**, *Adjunct Professor of Bioengineering*. DDS, New York University, 1948
- Christmas, Richard Judson**, *Adjunct Professor of Parks, Recreation, and Tourism Management*. BS, University of Southern Mississippi, 1967; MA, 1972, EdS, 1974, PhD, 1980, University of Northern Colorado
- Christopher, Raymond Anthony**, *Assistant Professor of Geological Sciences*. BS, 1965, MS, 1967, University of Rhode Island; PhD, Louisiana State University, 1971

- Claire, Alison L., *Associate Professor of Accounting*. BBA, University of Wisconsin, 1967; MS, Clemson University, 1973; PhD, University of Georgia, 1989; CPA
- Clark, Lawrence Stanley, *Associate Professor of Accounting*. BBA, Augusta College, 1968; MAcct, University of Georgia, 1970; CPA, CMA
- Clark, Sue Brannon, *Adjunct Professor of Environmental Engineering and Science*. BS, Lander College, 1984; MS, 1987, PhD, 1989, Florida State University
- Clarke, Brock Anthony, *Assistant Professor of English*. BA, Dickinson College, 1990; MA, 1992, PhD, 1997, University of Rochester
- Clarke, David Bruce, *Assistant Professor of Civil Engineering*. BS, 1979, MS, 1982, PhD, 1995, University of Tennessee
- Clarke, Richard Lee, *Associate Professor of Management*. BS, Hobart College, 1967; MS, Air Force Institute of Technology, 1974; PhD, University of Texas, 1988
- Clarke, Shima Najem, *Assistant Professor of Construction Science and Management*. BA, 1989, MA, 1985, PhD, 1997, University of Tennessee
- Clausen, Cathryn Louise, *Assistant Professor of Parks, Recreation, and Tourism Management*. BS, California State Polytechnic University, 1982; MS, University of Iowa, 1986; JD, Georgetown University Law Center, 1992
- Clayhold, Jeffrey Aaron, *Assistant Professor of Physics and Astronomy*. BS, California Institute of Technology, 1984; PhD, Princeton University, 1989
- Clayton, Donald Delbert, *Professor of Physics*. BS, Southern Methodist University, 1956; PhD, California Institute of Technology, 1962
- Cleveland, Linda Chandler, *Lecturer in Engineering Graphics*. BS, 1981, MS, 1984, Clemson University
- Coates, John Thomas, Jr., *Research Associate/Assistant Professor of Environmental Engineering and Science*. BS, Middle Tennessee State University, 1968; MS, 1981, PhD, 1984, Clemson University
- Cochrane, Gordon Marshall, *Assistant Librarian*. BA, Hillsdale College, 1989; MLS, University of South Carolina, 1992
- Coffey, Dennis Wade, *Associate Professor of Construction Science and Management*. BA, Berea College, 1972; MA, 1975, MBA, 1979, University of Alabama; MBC, Auburn University, 1996; PhD, University of Tennessee, 1988
- Coffin, Marie Ann, *Assistant Professor of Mathematical Sciences*. BS, 1985, MS, 1988, South Dakota State University; PhD, Iowa State University, 1993
- Coggeshall, John Michael, *Professor of Sociology*. BA, 1975, MA, 1978, PhD, 1984, Southern Illinois University
- Colacino, James Michael, *Associate Professor of Biological Sciences and Bioengineering*. BA, St. John Fisher College, 1968; MA, 1970, PhD, 1973, State University of New York
- Coleman, Katherine Young, *Adjunct Assistant Professor of Agricultural and Applied Economics*. BS, 1981, MS, 1983, Clemson University; PhD, Texas A&M University, 1989
- Collier, John Anton, *Professor of Agricultural and Biological Engineering*. BA, Georgia Institute of Technology, 1970; MS, University of Georgia, 1972; PhD, Clemson University, 1978; PE
- Collins, Carol Anne, *Research Associate/Lecturer of Theatre*. BA, Eckerd College, 1975; MA, Eastern Michigan University, 1978; MFA, Yale University, 1985
- Collins, Donald Lynn, *Chair of Department of Planning and Landscape Architecture; Professor of Architecture*. BLA, North Carolina State University, 1968; MLA, Harvard University, 1969
- Collins, Edward Randolph, Jr., *Associate Professor of Electrical and Computer Engineering*. BS, North Carolina State University, 1984; PhD, Georgia Institute of Technology, 1989
- Collins, Rebecca Froneberger, *Lecturer in School of Nursing*. BSN, Duke University, 1959; MSN, Washington University, 1968; PhD, University of South Carolina, 1992
- Collins, Thomas Frank, *Associate Professor of Physics and Astronomy*. BA, Mercer University, 1956; MS, Clemson University, 1958
- Comfort, Janice Gross, *Assistant Librarian*. BS, West Virginia University, 1981; MLS, University of Pittsburgh, 1991
- Conner, William Henry, *Associate Professor of Forest Resources*. Belle W. Baruch Forest Science Institute. BS, Virginia Polytechnic Institute and State University, 1973; MS, 1975, PhD, 1988, Louisiana State University
- Connor-Greene, Patricia Anne, *Alumni Distinguished Professor of Psychology*. BA, Wells College, 1976; PhD, University of South Carolina, 1983
- Cooksey, Delva Kay, *Associate Professor of Packaging Science*. BS, Purdue University, 1984; MS, Indiana State University, 1985; PhD, University of Illinois, 1992
- Cooper, C. Camille, *General Librarian*. BA, Davidson College, 1989; MA, University of Georgia, 1992; MLIS, University of Texas-Austin, 1997
- Cooper, George IV, *Adjunct Professor of Bioengineering*. BA, Williams College, 1964; MD, Cornell University Medical College, 1968
- Cooper, Melanie Margaret, *Professor of Chemistry*. BS, 1975, MS, 1976, PhD, 1978, Manchester University
- Copeland, Karen Adelle, *Visiting Instructor of Mathematical Sciences*. BA, St. Olaf College, 1987; MS, 1989, PhD, 1994, Clemson University
- Cordell, Harold Kenneth, *Adjunct Professor of Forest and Recreation Resources*. BSF, 1966, ME, 1967, PhD, 1975, North Carolina State University
- Corrales, Norma, *Instructor of Spanish*. BA, Universidad Pontificia Bolivariana, 1977; MA, Instituto Caro y Cuervo, Seminario Andres Bello, 1985; PhD, Ohio University, 1988
- Costa, Ralph, *Adjunct Assistant Professor of Forest Resources*. BS, 1973, MS, 1976, University of Arizona
- Courtney, Gregory Wayne, *Adjunct Assistant Professor of Entomology*. BS, Oregon State University, 1982; PhD, University of Alberta, 1989
- Courtney, William Henry III, *Associate Professor of Horticulture, Coastal Research and Education Center*. BS, University of Kentucky, 1974; MS, University of Missouri, 1976; PhD, University of New Hampshire, 1979
- Cover, Peggy Hopkins, *Head of Reference Unit; Librarian*. BA, Blue Mountain College, 1962; MS, University of Illinois, 1965
- Cox, Christopher Lee, *Associate Professor of Mathematical Sciences*. BS, Grove City College, 1978; MS, 1980, PhD, 1984, Carnegie-Mellon University
- Cox, Debra Phillips, *Visiting Instructor of Curriculum and Instruction*. BA, 1984, MEd, 1987, PhD, 1997, Clemson University
- Crader, Kelly Wayne, *Professor of Sociology*. BS, MS, 1968, Illinois State University; PhD, Emory University, 1971
- Craig, Cheryl Howard, *Lecturer in School of Nursing*. BSN, University of South Carolina, 1973; MS, Clemson University, 1987
- Craig, Lynn George, *Professor of Architecture*. BA, Arch, Clemson University, 1967; MArch, Washington University, 1969; AIA, RIBA, APA
- Cramer, Sarah Sally, *Instructor of Graphic Communications*. BA, Furman University, 1990; MInEd, Clemson University, 1993
- Crane, Martin M., *Adjunct Associate Professor of Microbiology; Biomedical Associate Professor, GHSCU Biomedical Cooperative; Research Epidemiologist, Greenville Hospital System*. BA, University of California-Berkeley, 1972; MS, 1980, PhD, 1986, University of Texas
- Cranston, Mechthild, *Professor of French*. BA, 1958, PhD, 1966, University of California
- Creager, Karen Ann, *Lecturer in Chemistry*. BSE, University of Michigan, 1983; PhD, University of North Carolina, 1989
- Creager, Stephen Edward, *Associate Professor of Chemistry*. BS, Rensselaer Polytechnic Institute, 1982; PhD, University of North Carolina, 1987
- Crew, Linda Jean, *Lecturer in School of Nursing*. BSN, Jacksonville State University, 1981; MBA, Clemson University, 1991
- Cridger, Charles Franklin, *Visiting Instructor of Agricultural and Applied Economics and Financial Management*. BS, The Citadel, 1980; BMA, University of Florida, 1990
- Crino, Michael Dwayne, *Alumni Distinguished Professor of Management*. BA, State University of New York, 1969; MA, Northern Illinois University, 1971; MS, University of Arkansas, 1973; PhD, University of Florida, 1978
- Crockett, David Jesse, *Lecturer in Chemistry*. BA, University of South Carolina, 1974
- Cross, Dee Lewis, *Professor of Animal Science*. BS, Austin Peay State University, 1968; MS, 1971, PhD, 1973, University of Kentucky
- Cross, James Edward, *Associate Librarian*. BA, Cleveland State University, 1979; MA, MLS, Case Western Reserve University, 1982
- Cross, Sydney Ann, *Professor of Art*. BFA, Northern Arizona University, 1977; MFA, Arizona State University, 1980
- Crowley, Michael Summers, *Adjunct Professor of Ceramic and Materials Engineering*. BS, Iowa State University, 1953; PhD, Pennsylvania State University, 1959; PE
- Cuddy, Brian Gerard, *Adjunct Assistant Professor of Bioengineering*. BS, State University of New York-Albany, 1981; MS, 1983, MD, 1987, Albany Medical College
- Culin, Joseph Dayton, *Professor of Entomology*. BA, Eastern College, 1975; MS, University of Delaware, 1977; PhD, University of Kentucky, 1981
- Culler, John Madison, *Lecturer in Philosophy*. BS, University of South Carolina, 1992; PhD, University of Pittsburgh, 1993
- Cumbest, Randolph Josh, *Adjunct Assistant Professor of Geological Sciences*. BS, Auburn University, 1979; MS, University of Georgia, 1987; PhD, Virginia Polytechnic Institute and State University, 1988
- Cummings, Candace James, *Extension Wildlife Associate of Aquaculture, Fisheries, and Wildlife*. BS, 1986, MS, 1989, Clemson University
- Cummings, John Richard, *Lecturer in Biology*. BS, 1983, MS, 1988, Bowling Green State University
- Cunningham, Miller Grant, *Assistant Professor of Planning*. BA, Duke University, 1979; MA, University of South Carolina, 1985; PhD, Clemson University, 1995
- Curren, Constantine W., President. BA, University of Kentucky, 1962; MA, University of Illinois, 1965; EdD, University of Kentucky, 1967
- Curren, Jo Hern, *Lecturer in Legal Studies*. BA, 1962, JD, 1975, University of Kentucky; LL.M., Emory University, 1983
- Curtis, Charles Edward, Jr., *Associate Professor of Agricultural and Applied Economics*. BS, 1977, MS, 1979, University of Georgia; PhD, University of Nebraska, 1985
- Daiger, Glen Thomas, *Adjunct Professor of Environmental Engineering and Science*. BS, 1973, MS, 1975, PhD, 1979, Purdue University
- Dale, Elizabeth Ruth, *Assistant Professor of History*. BA, DePauw University, 1981; JD, Chicago Kent College of Law, 1984; PhD, University of Chicago, 1995
- Danescu, Radu, *Visiting Assistant Professor of Mechanical Engineering*. BS, 1980, MS, 1985, Polytechnic University of Bucharest (Romania); PhD, Clemson University, 1998

- Daniell, Beth**, Associate Professor of English. BA, Mercer University, 1969; MA, Georgia State University, 1973; PhD, University of Texas, 1986
- Daniels, James Howard**, Associate Vice President and Executive Director of Governmental Relations, Institutional Advancement and Division of Agriculture and Natural Resources; Professor of Agricultural Education and Biosystems Engineering. BSE, University of Arkansas, 1970; MEd, 1974; EdD, 1975, University of Illinois
- Dattilo, John**, Adjunct Associate Professor of Parks, Recreation, and Tourism Management. BS, Pennsylvania State University, 1977; MA, University of Arizona, 1981; PhD, University of Illinois, 1984
- Davies, Brian Ewart**, Professor of Geological Sciences. BS, 1959, PhD, 1963, University College of North Wales
- Davis, Jack Wayne**, Head of Agricultural Support Department. BS, 1975, MAg, 1976, Clemson University
- Davis, James Richard**, Professor of Accounting. BBA, 1968, MPA, 1970, PhD, 1974, Georgia State University; CMA
- Davis, John Stephen**, Professor of Management. BS, U.S. Military Academy, 1965; MS, University of Southern California, 1972; MS, Boston University, 1979; PhD, Georgia Institute of Technology, 1984
- Davis, Martin Alan**, Professor of Architecture. BArch, University of Oklahoma, 1971; MPhil, University of Edinburgh (Scotland), 1973; AIA
- Davis, Michael G.**, Adjunct Assistant Professor, GHS/CU Biomedical Cooperative. BS, Western Kentucky University, 1982; MS, University of Kentucky, 1985; JD, South Texas College of Law, 1994
- Davis, Robert Pratt**, Professor of Industrial Engineering. BSIE, 1970, MS, 1971, University of Tennessee; PhD, Oklahoma State University, 1973; PE
- Davis, Rose Jones**, Professor of Family and Youth Development, Pee Dee Research and Education Center. BS, 1962, MS, 1964, Winthrop College; EdD, University of South Carolina, 1983
- Davis, William Jeffrey**, Adjunct Professor of Civil Engineering. BS, University of Alabama, 1981; MS, Auburn University, 1987; PhD, Georgia Institute of Technology, 1997
- Daw, Murray Scott***, Professor of Physics. BS, University of Florida, 1976; PhD, California Institute of Technology, 1981
- Dawson, Darren Merritt**, Professor of Electrical Engineering. BSEE, 1984, PhD, 1990, Georgia Institute of Technology
- Dawson, Paul Lee**, Associate Professor of Food Science. BS, Salisbury State University, 1979; MS, University of Florida, 1986; PhD, North Carolina State University, 1989
- Day, Frank Louis**, Professor of English. BS, Gorham State College, 1954; MA, University of Tennessee, 1959; MA, University of Rochester, 1967
- Dean, Ralph Adrian**, Associate Professor of Plant Pathology and Physiology. BS, University of London, 1980; PhD, University of Kentucky, 1986
- Dearing, Perino Marcellin, Jr.**, Professor of Mathematical Sciences. BS, 1963, MA, 1985, University of North Carolina; ME, 1971, PhD, 1972, University of Florida
- Deeken, JoAnne Marie**, Head of Acquisitions; Associate Librarian. BA, University of Dallas, 1975; MSLS, North Texas State University, 1984
- DeGeorge, Bradley Victor**, Assistant Professor of Political Science. BA, 1984, MS, 1985, Shippensburg University of Pennsylvania; CAGS, 1993, PhD, 1995, Virginia Polytechnic Institute and State University
- Dehner, Mary Hopkins**, Instructor of Speech. BA, Northern Illinois University, 1974; MA, Governor's State University, 1984
- Del Collo, Sarah**, Instructor of English. BA, 1993, MA, 1995, Clemson University; PhD, University of London, 1998
- Delicio, Gail Celeste**, Associate Professor of Educational Foundations. BA, 1972, BS, 1973, Southern Illinois University; MEd, Stetson University, 1983; PhD, Florida State University, 1989
- Dellinger, Eric H.**, Adjunct Associate Professor, GHS/CU Biomedical Cooperative. BA, University of North Carolina, 1980; MD, East Carolina University School of Medicine, 1986
- Derrick, Fletcher, Jr.**, Adjunct Professor of Poultry Science. BS, Clemson University, 1954; MD, Medical College of South Carolina, 1958
- DeSimone, Heather Denise**, Assistant Professor of Mathematical Sciences. BS, Youngstown State University, 1991; MS, College of William and Mary, 1992; PhD, Duke University, 1995
- DesMarteau, Darryl Dwayne**, Tobey-Beaudrot Professor of Chemistry. BS, Washington State University, 1963; PhD, University of Washington, 1966
- Detrich, David Mark**, Associate Professor of Art. BFA, Kansas City Art Institute, 1980; MFA, Alfred University, 1982
- Detmar, Kevin John Hoffman**, Associate Professor of English. BA, 1981, MA, 1988, PhD, 1990, University of California
- Devens, Susan Denise**, Instructor of English. BA, Cameron College, 1972; MA, Texas Woman's University, 1982
- DeVol, Timothy Alan**, Assistant Professor of Environmental Engineering and Science. BS, Ohio State University, 1987; MS, 1988, PhD, 1993, University of Michigan
- Dickens, Thomas Lester**, Professor of Accounting. BA, University of Richmond, 1968; MBA, Virginia Commonwealth University, 1977; PhD, Texas A&M University, 1983; CPA, CMA
- Dickenson, Russell Errett**, Adjunct Professor of Recreation Resource Management. BA, Northern Arizona University, 1947
- Dickey, Jean Louise**, Professor of Biology. BS, Kent State University, 1972; PhD, Purdue University, 1982
- Dickson, Sandra G.**, Lecturer in School of Nursing. BS, 1992, MS, 1996, Clemson University
- Diehl, John Richard**, Professor of Animal Science. BS, Kansas State University, 1965; PhD, University of Missouri, 1973
- Dieter, Richard Karl**, Professor of Chemistry. BS, Lehigh University, 1973; PhD, University of Pennsylvania, 1981
- DiMeglio, Sebastian Joseph**, Adjunct Professor of Travel and Tourism. BS, Mount St. Mary's College, 1953
- Dimond, Thomas**, Associate Professor of Art. BFA, Massachusetts College of Art, 1966; MFA, University of Tennessee, 1969
- Dinger, Dennis Russell**, Professor of Ceramic and Materials Engineering. BS, Alfred University, 1970; MS, 1974, MS, 1975, PhD, 1975, Pennsylvania State University; PE
- Dixon, Deborah Ann**, Research Associate/Assistant Professor of Physics and Astronomy. BS, University of Georgia, 1978; PhD, University of Miami, 1988
- Dixon, Marvin Warren**, Alumni Distinguished Professor of Mechanical Engineering. BS, 1964, MS, 1965, Louisiana State University; PhD, Northwestern University, 1971; PE
- Doar, LeRoy Henning, Jr.**, Lecturer in Packaging Science. BChE, Clemson University, 1952; MA, Webster University, 1989
- Dodd, Roy Bryon, Jr.**, Associate Professor of Biosystems Engineering. BS, 1968, MS, 1977, University of Georgia; PhD, Clemson University, 1983; FE
- Doerr, Marvin Leroy**, Visiting Assistant Professor of Chemistry. AB, Washington University, 1961; PhD, Georgia Institute of Technology, 1967
- Dolloff, C. Andrew**, Adjunct Associate Professor of Forest Resources. BS, University of Maine, 1975; North Carolina State University, 1979; PhD, Montana State University, 1983
- Dooley, Ronald Larry**, Director, School of Chemical and Materials Engineering; Chair and Professor of Bioengineering; Adjunct Professor, GHS/CU Biomedical Cooperative. BS, Virginia Polytechnic Institute and State University, 1968; MS, 1973, PhD, 1976, Clemson University
- Doost, Roger Khoda**, Professor of Accounting. BBA, University of Georgia, 1975; MBA, International Management Institute (Tehran), 1973; MAcc, DPA, 1984, University of Georgia; CMA, GPS
- Dorsch, Michael John**, Associate Professor of Marketing. BS, 1978, MBA, 1980, PhD, 1987, University of Arkansas
- Doruk, Birsan**, Lecturer of Architecture. DIP, 1958, DEngR, 1965, Istanbul Technical University
- Doruk, Teoman Kaya**, Professor of Architecture. DipEngRch, 1958, DEngR, 1965, Istanbul Technical University
- Dottavio, Floyd Dominic**, Adjunct Professor of Parks, Recreation, and Tourism Management. BS, Ohio State University, 1973; MFS, Yale University, 1975; PhD, Purdue University, 1979
- Doty, Wells B.**, Visiting Instructor in Technology and Human Resource Development. BS, U.S. Naval Academy, 1962; MS, U.S. Naval Post-Graduate School, 1971
- Dougan, William Richmond**, Chair and Professor of Economics. BA, University of Virginia, 1971; MA, 1976, PhD, 1981, University of Chicago
- Dowler, William M.**, Adjunct Professor of Plant Pathology and Physiology. BS, 1954, MS, 1958, University of Missouri; PhD, University of Illinois, 1961
- Drabos, David J.**, Adjunct Professor of Microbiology and Plant Pathology and Physiology. BS, Manhattan College, 1973; PhD, University of Pittsburgh, 1979
- Drake, Thomas Lynn**, Professor of Electrical and Computer Engineering. BS, Tri-State College, 1958; MS, 1959, PhD, 1964, Michigan State University
- Drapear, Pamela Ann**, Assistant Librarian. BA, 1973, MA, 1976, Texas Tech University; PhD, 1987, MA, 1989, University of Missouri
- Draughn, Robert Allen**, Adjunct Associate Professor of Bioengineering. BS, 1960, MS, 1961, North Carolina State University; DSc, University of Virginia, 1968
- Drew, Leland Overbey**, Lecturer in Civil Engineering. BS, Clemson University, 1943; MS, Iowa State, 1945; PhD, Michigan State University, 1963
- Drews, Michael James, J. E.** Sirmine Professor of Textiles. BS, University of Wisconsin, 1967; PhD, North Texas State University, 1971
- Drye, Charles Edwin**, Professor of Plant Pathology and Physiology, Edisto Research and Education Center. BS, Lenoir-Rhyne College, 1969; MA, Appalachian State University, 1972; PhD, Clemson University, 1976
- Duan, Jinqiao**, Assistant Professor of Mathematical Sciences. BS, Wuhan University, 1983; MS, University of Massachusetts, 1990; PhD, Cornell University, 1993
- Dubose, Sarah McConnell**, Extension Associate of Biosystems Engineering. BS, University of South Carolina, 1982
- DuBreuil, Richard Louis**, Assistant Professor of Military Science. CPT, U.S. Army; BBA, James Madison University, 1988
- Duchowski, Andrew Ted**, Assistant Professor of Computer Science. BS, Simon Fraser University, 1990; PhD, Texas A&M University, 1997
- Dufault, Robert James**, Professor of Horticulture, Coastal Research and Education Center. BS, Norwich University, 1976; MS, University of Vermont, 1978; PhD, Kansas State University, 1982
- Duke, Charles Roy**, Associate Professor of Marketing. BSME, Louisiana Tech University, 1970; MBA, Oklahoma City University, 1976; PhD, University of Texas-Arlington, 1988

- Dumin, David Joseph**, Samuel R. Rhodes Professor of Electrical and Computer Engineering. BS, Johns Hopkins University, 1957; MS, Purdue University, 1961; PhD, Stanford University, 1964
- Dunn, Benjamin Allen**, Director, School of Natural Resources; Interim Chair and Professor of Forest Resources. BSE, 1965; MEd, 1968, PhD, 1971, University of Georgia
- Dunnivant, Frank Morris**, Adjunct Assistant Professor of Environmental Engineering and Science. BS, Auburn University, 1980; MS, 1985, PhD, 1988, Clemson University
- Dunston, Pamela Jill**, Assistant Professor of Curriculum and Instruction. BS, 1974, MA, 1978, Ball State University; PhD, University of Georgia, 1993
- Durand, Pascal**, Adjunct Associate Professor of Agricultural and Applied Economics. BMath, Institut des Chateaux de Lyon, 1962; Ecole Nationale Supérieure Agronomique de Montpellier, 1968; Bageon, Appliquées de Dijon, 1969
- Durham, William Harry**, Lecturer in Legal Studies. BA, Auburn University, 1954; MA, University of North Carolina, 1962
- Dyck, Lawrence Alan**, Professor of Botany. BA, University of California, 1965; PhD, Washington University, 1970
- Eastland, Lynette Joy**, Associate Professor of Speech. BA, Central College, 1967; MA, 1976, PhD, 1986, University of Utah
- Edge, Sandy**, Professor of Aerospace Studies. COL, U.S. Air Force; BS, Clemson University, 1980; MS, Troy State University, 1980
- Edie, Danny Dale**, Dow Professor of Chemical Engineering. BS, Ohio University, 1965; MSES, University of Toledo, 1969; PhD, University of Virginia, 1972
- Edminster, Warren Ellis**, Instructor of English. BA, Baylor University, 1989; MA, Clemson University, 1991
- Edwards, Frances Lea**, Associate Professor of Legal Studies. BA, Graceland College, 1972; JD, University Kansas, 1980
- Edwards, Karen Wynn**, Lecturer of Public Health. BA, 1988, MEd, 1990, Furman University
- Egan, Clifton Scott Miller**, Professor of Theatre. BA, Hanover College, 1973; MFA, Northwestern University, 1976
- Egan, Linda Diane**, Instructor of Speech. BA, Hanover College, 1972; MA, Northwestern University, 1975
- Eisiminger, Sterling Kenwood**, Professor of English. BS, 1967, MA, 1968, Auburn University; PhD, University of South Carolina, 1974
- Elliott, Ralph Delano**, Associate Dean for Executive Education and Development, College of Business and Public Affairs; Professor of Economics. BS, 1967, MS, 1968, PhD, 1972, North Carolina State University
- Ellis, Brenda**, Assistant Librarian. BA, University of the South, 1986; MS, University of North Carolina, 1990
- Ellison, Michael Scot**, Professor of Textiles. BS, 1971, MA, 1973, PhD, 1983, University of California
- Elzerman, Alan William**, Chair and Professor of Environmental Engineering and Science; Director, School of the Environment. BA, Williams College, 1971; PhD, University of Wisconsin, 1976
- English, William Rockford**, Assistant Professor of Forest Resources. BS, Oregon State University, 1980; MS, University of Missouri-Columbia, 1983; PhD, Clemson University, 1991
- Erich, Donald L.**, Research Associate in Environmental Engineering and Science; Managing Director of the Vitrification Lab. BS, 1971, MS, 1973, Drexel University
- Ervin, Vincent John**, Associate Professor of Mathematical Sciences. BSc, Royal Melbourne Institute of Technology (Australia), 1978; PhD, Georgia Institute of Technology, 1984
- Eskridge, William Franklin**, Director of Construction Industry Cooperative Alliance; Lecturer in Civil Engineering. BS, Clemson University, 1960; PE
- Eubanks, Francis Marion**, Associate Professor of Construction Science and Management. BS, 1967, MS, 1968, Georgia Institute of Technology
- Eubanks, Isaac Dwayne**, Professor of Chemistry. BS, 1960, PhD, 1963, University of Texas
- Eubanks, Lucy Tripp**, Lecturer in Chemistry. BA, Mt. Holyoke College, 1960; MS, Seattle University, 1967
- Evans, Guy Davis**, Research Associate/Professor of Ceramic and Materials Engineering. BS, 1991, MS, 1997, Clemson University
- Evans, Larry W.**, Adjunct Associate Professor of Graphic Communications. BS, Rochester Institute of Technology, 1977
- Evatt, Helyn Elisabeth**, Instructor of English. BA, 1994, MA, 1997, Clemson University
- Eversole, Arnold George**, Professor of Fisheries. BS, Pennsylvania State University, 1963; MS, 1969, PhD, 1974, Syracuse University
- Fadel, Georges Michel**, Associate Professor of Mechanical Engineering. Diploma, Swiss Federal Institute of Technology, ETH Zurich, 1976; MSc, 1978, PhD, 1988, Georgia Institute of Technology
- Fallon, Dennis John**, Adjunct Professor of Civil Engineering. BS, Old Dominion University, 1970; MS, 1972, PhD, 1980, North Carolina State University
- Falta, Ronald William, Jr.**, Associate Professor of Geology and Environmental Engineering and Science. BS, 1982, MS, 1984, Auburn University; PhD, University of California, 1990
- Farris, Harold E., Jr.**, Professor of Animal Physiology. BS, 1963, DVM, 1965, University of Missouri; MS, Ohio State University, 1968
- Farris, John Terrence**, Assistant Professor of Planning. BA, St. Louis University, 1968; MUP, 1974, PhD, 1996, Michigan State University; AICP
- Felder, Frankie Ottowies**, Associate Dean of International Programs and Services; Assistant Professor of Curriculum and Instruction. BS, Virginia Commonwealth University, 1972; MEd, University of Vermont, 1974; MEd, 1984, EDD, 1986, Harvard University
- Fendley, Susan Tankersley**, Instructor of English. BA, Winthrop College, 1969; MA, Clemson University, 1971
- Fendley, Timothy Thomas**, Professor of Wildlife. BSE, 1965, MSc, 1968, University of Georgia; PhD, Utah State University, 1978
- Feng, Jianhua**, Visiting Assistant Professor of Early Childhood Education. BED, Huazhong Normal University, 1985; MS, Wheelock College, 1988; EDD, University of Memphis, 1992
- Fennell, Robert Emmett**, Professor of Mathematical Sciences. BA, Bradley University, 1964; MS, 1966, PhD, 1969, University of Iowa
- Ferguson, Michael W.**, Adjunct Professor of Plant Pathology and Physiology. BA, California State University, 1974; MS, California State Polytechnic University-Pomona, 1976; PhD, Kansas State University, 1981
- Ferguson, Nancy Hilton**, Associate Professor of Crop and Soil Environmental Science. BA, Emory University, 1967; PhD, Clemson University, 1982
- Fernandez, Rodney Thomas**, Assistant Professor of Horticulture. BS, 1986, MS, 1989, University of Florida; PhD, Michigan State University, 1992
- Ferrell, William Garland, Jr.**, Associate Professor of Industrial Engineering. BA, Wake Forest University, 1977; MS, Virginia Polytechnic Institute and State University, 1979; PhD, North Carolina State University, 1988; PE
- Fery, Richard Lee**, Adjunct Professor of Horticulture, U.S. Vegetable Laboratory. BS, Oregon State University, 1966; PhD, Purdue University, 1970
- Fetta, Iris Brann**, Assistant Professor of Mathematical Sciences. BS, Southeastern Louisiana College, 1964; MS, Clemson University, 1966
- Figliola, Richard Stephen**, Chair and Professor of Mechanical Engineering. BS, 1974, MS, 1976, PhD, 1979, University of Notre Dame; PE
- Firrell, Lynn M.**, Visiting Assistant Professor of Special Education. BS, University of Illinois-Urbana-Champaign, 1967; MEd, 1974, EDD, 1980, University of Virginia
- Fischer, James Roland**, Dean for Agricultural Research; Director of Agricultural Experiment Station; Professor of Biosystems Engineering. BS, 1967, MS, 1969, PhD, 1972, University of Missouri; PE
- Fisk, William Robert**, Chair and Professor of Educational Foundations. BS, 1973, MS, 1976, PhD, 1979, Florida State University
- Fjeld, Robert Alan, Jerry E. and Harriet Calvert Dempsey**, Professor of Waste Management. BS, North Carolina State University, 1970; MS, 1973, PhD, 1976, Pennsylvania State University; PE
- Flanigan, Jackson Lee**, Professor of Educational Leadership. BA, Salem College, 1959; MA, West Virginia University, 1964; EDD, Virginia Polytechnic Institute and State University, 1986
- Flatt, Janice Marie**, Visiting Instructor in Mathematical Sciences. BS, 1979, MS, 1981, Clemson University
- Fleming, Kirsten MacKenzie**, Visiting Associate Professor of Mathematical Sciences. BSc, University of London (England), 1985; MSc, 1987, PhD, 1989, Birmingham University (England)
- Flower, Phillip John**, Associate Professor of Physics and Astronomy. BS, University of Toledo, 1970; PhD, University of Washington, 1976
- Floyd, Myron Fran**, Adjunct Assistant Professor of Parks, Recreation, and Tourism Management. BS, 1983, MS, 1986, Clemson University; PhD, Texas A&M University, 1990
- Foltz, Jeffrey Wayne**, Professor of Fisheries. BS, Ohio State University, 1972; MS, University of Wisconsin, 1974; PhD, University of Colorado, 1978
- Fones, Shelley White**, Associate Professor of Curriculum and Instruction. BS, 1968, PhD, 1974, Clemson University
- Fortnum, Bruce Allan**, Professor of Plant Pathology and Physiology, Pee Dee Research and Education Center. BA, LaSalle College, 1973; MS, University of Delaware, 1975; PhD, Clemson University, 1978
- Foster, Ida Sloan**, Associate Librarian. BA, Bennett College, 1962; MSLS, Atlanta University, 1973
- Fox, Jannie Darlene**, Visiting Instructor of Geology. BS, Southeast Missouri State University, 1991
- Franklin, Ralph Earl**, Professor of Crop and Soil Environmental Science. BSA, 1955, MS, 1957, University of Arkansas; PhD, Ohio State University, 1961
- Franzreb, Kathleen E.**, Adjunct Associate Professor of Forest Resources. BA, 1970, MA, 1971, University of California-Los Angeles; PhD, Arizona State University, 1975
- Fredendall, Lawrence Dean**, Associate Professor of Management. BS, Central Michigan University, 1972; MBA, 1986, PhD, 1990, Michigan State University
- Frederick, James Charles, Jr.**, Research Associate/Facilities Manager of Center for Engineering Ceramic Manufacturing. BS, 1966, MS, 1967, Clemson University
- Frederick, James Russell**, Associate Professor of Crop and Soil Environmental Science. BS, 1981, MS, 1983, Pennsylvania State University; PhD, University of Illinois, 1987
- Freedman, David Lewis**, Associate Professor of Environmental Engineering and Science. BS, University of Wisconsin, 1978; MS, University of Cincinnati, 1985; PhD, Cornell University, 1990
- Freidman, Harold Ira**, Adjunct Professor of Bioengineering. BS, Hobart College, 1967; PhD, 1972, MD, 1974, University of Virginia

- Friedlob, George Thomas, *Professor of Accounting*. BA, Vanderbilt University, 1963; MBA, University of Louisville, 1972; PhD, University of Mississippi, 1981; CPA, CMA
- Friedman, Richard Joel, *Adjunct Professor of Bioengineering*. BS, 1976, MD, 1980, University of Toronto
- Fuhr, Donald Lee, *Professor of Educational Leadership*. BA, Bethany College, 1958; MEd, West Virginia University, 1965; EdD, University of Pittsburgh, 1971
- Funk, James Edward, *Adjunct Professor of Ceramic and Materials Engineering*. BS, 1953, MS, 1964, Alfred University
- Funk, James Edward, Jr., *Adjunct Professor of Ceramic and Materials Engineering*. BS, 1975, MS, 1981, Alfred University; PhD, University of Missouri-Rolla, 1990
- Gaddis, Joseph Leo, *Professor of Mechanical Engineering*. BS, 1961, MS, 1963, New Mexico State University; PhD, University of Texas, 1969
- Gahan, Lawrence Willard, *Alumni Distinguished Professor of Parks, Recreation, and Tourism Management*. BS, 1960, MS, 1964, PhD, 1970, University of Illinois
- Gallagher, Colin Mark, *Assistant Professor of Mathematical Sciences*. BS, Sonoma State University, 1993; MS, 1994, PhD, 1998, University of California-Santa Barbara
- Galluscio, Eugene Hugo, *Professor of Psychology*. BA, California State College, 1966; MA, 1969, PhD, 1970, Louisiana State University
- Galylean, Ronald Dale, *Professor of Food Science*. BS, Southwest Missouri State University, 1966; MS, 1972, PhD, 1975, University of Missouri
- Gangemi, Joseph David, *Director of Greenville Hospital System Cooperative Research and Education Program; Professor of Microbiology*. BS, Clemson University, 1969; PhD, University of North Carolina School of Medicine, 1973
- Gao, Xuhong, *Assistant Professor of Mathematical Sciences*. BS, 1983, MS, 1986, Sichuan University; PhD, University of Waterloo, 1993
- Garcia, Ricardo Alberto, *Associate Professor of Biology*. BS, 1968, MEd, 1970, University of Houston; PhD, Texas A&M University, 1975
- Garner, Peggy Ford, *Lecturer in Mathematical Sciences*. BS, Furman University, 1961; MSED, Old Dominion University, 1985
- Garrett, James Thomas, *Visiting Associate Professor of Horticulture, Pee Dee Research and Education Center*. BS, 1964, MS, 1966, Clemson University
- Garrett, Thomas Roy, *Instructor of Biosystems Engineering*. BS, 1970, MS, 1974, Clemson University
- Garrison, Arthur Wayne, *Adjunct Professor of Environmental Engineering and Science*. BS, The Citadel, 1956; MS, Clemson University, 1958; PhD, Emory University, 1966
- Gass, John Henry, Jr., *Adjunct Assistant Professor of Electrical and Computer Engineering*. BS, California Institute of Technology, 1991; MS, University of Illinois-Urbana-Champaign, 1993; PhD, Clemson University, 1996
- Gaubert, James G., *Lecturer in Marketing*. BS, 1982, MBA, 1984, Nicholls State University
- Gauderer, Michael W. L., *Biomedical Professor, GHS/UC Biomedical Cooperative; Head of Pediatric Surgery, Children's Hospital, Greenville Hospital System*. MD, Faculdade de Medicina da Universidade Federal do Rio de Janeiro (Brazil), 1968
- Gauthreaux, Sidney Anthony, Jr., *Professor of Zoology*. BS, 1963, MS, 1965, PhD, 1968, Louisiana State University
- Geddes, Doreen Steiner, *Chair of Speech and Communication Studies Program; Associate Professor of Speech*. BS, Florida State University, 1969; MA, University of West Florida, 1982; PhD, Pennsylvania State University, 1988
- Gee, Adrian P., *Adjunct Professor, GHS/UC Biomedical Cooperative*. BS, University of Birmingham (United Kingdom), 1973; PhD, University of Edinburgh (Scotland), 1977
- Geist, Robert Miller III, *Professor of Computer Science*. BA, Duke University, 1970; MS, 1973, PhD, 1974, University of Notre Dame
- Ghaffar, Abdul, *Adjunct Professor, GHS/UC Biomedical Cooperative*. BS, University of Karachi (Pakistan), 1962; MPhil, University of London (England), 1970; PhD, University of Edinburgh (Scotland), 1973
- Gharpuray, Vasanti Manohar, *Associate Professor of Bioengineering*. BE, University of Poona, 1983; MS, Vanderbilt University, 1986; PhD, Northwestern University, 1990
- Gibson, Lynette, *Lecturer in School of Nursing*. BSN, Medical University of South Carolina, 1982; MS, Clemson University, 1987
- Gillespie, Jackie Sheriff, *Instructor of Nursing*. BS, Clemson University, 1975; MSN, University of South Carolina, 1979
- Gimenez, Tomas, *Professor of Animal Science*. MVZ, National University of Mexico, 1969; DnMedVet, Institut für Physiologie Technische Universität München, 1975
- Girgis, Adly Ageeb, *Duke Power Distinguished Professor of Electrical and Computer Engineering*. BS, 1967, MS, 1973, Assiut University (Egypt); PhD, Iowa State University, 1981
- Glick, Bruce, *Adjunct Professor, GHS/UC Biomedical Cooperative*. BS, Rutgers University, 1951; MS, University of Massachusetts, 1952; PhD, Ohio State University, 1955
- Golan, Lawrence Peter, *Director of South Carolina Energy Research and Development Center; Lecturer in Mechanical Engineering*. BS, 1961, MS, 1964, West Virginia University; PhD, Lehigh University, 1968
- Golden, Jimmy K., *Associate Professor of Plant Pathology and Physiology, Sandhill Research and Education Center*. BS, 1965, MS, 1967, University of Georgia; PhD, University of California, 1972
- Goldstein, Karen, *Research Associate/Assistant Professor in School of Nursing*. BA, American University, 1967; MPH, Columbia University School of Public Health, 1986; PhD, University of Illinois-Urbana-Champaign, 1993
- Goldstein, Raymond L., *Chair, Department of Public Health; Associate Professor of Health Science*. BA, Columbia University, 1972; MA, Brown University, 1974; DrPH, Columbia University, 1983
- Gomes, Roger, *Associate Professor of Marketing*. BSME, University of Massachusetts, 1972; MBA, Bryant College, 1977; PhD, Virginia Polytechnic Institute and State University, 1988
- Gooden, Dewitt Talmadge III, *Professor of Crop and Soil Environmental Science, Pee Dee Research and Education Center*. BS, 1966, MS, 1972, PhD, 1974, North Carolina State University
- Gooding, Charles Harold, *Chair and Professor of Chemical Engineering*. BS, 1970, MS, 1972, Clemson University; PhD, North Carolina State University, 1979, PE
- Goodloe, David Wayne, *Assistant Professor of Construction Science and Management*. BS, Auburn University, 1979; MCSM, Clemson University, 1992
- Goodstein, Richard Edward, *Chair of Performing Arts; Director of Bands; Professor of Music*. RME, Miami University, 1975; MME, 1981, PhD, 1984, Arizona State University
- Gordon, David Bruce, *Associate Professor of Economics*. BA, 1979, PhD, 1995, University of Chicago
- Gorsuch, Clyde Stuart, *Professor of Entomology*. BS, University of Wisconsin-Oshkosh, 1971; MS, 1974, PhD, 1978, University of Wisconsin-Madison
- Gossett, Billy Joe, *Professor of Crop and Soil Environmental Science*. BS, University of Tennessee, 1957; MS, 1959, PhD, 1962, University of Illinois
- Goswami, Bhuvnesh Chandra, *Alumni Distinguished Professor of Textiles*. BS, Delhi University, 1959; MS, Bombay University, 1963; PhD, Manchester University, 1966
- Gowaty, Patricia Adair, *Adjunct Associate/Assistant Professor of Zoology*. BA, Tulane University, 1967; PhD, Clemson University, 1980
- Gowdy, John Norman, *Chair and Professor of Electrical and Computer Engineering*. BS, Massachusetts Institute of Technology, 1967; MS, 1968, PhD, 1971, University of Missouri
- Grady, Cecil Paul Leslie, Jr., *R. A. Bowen Professor of Environmental Engineering and Science*. BA, 1960, BS, 1961, MS, 1963, Rice University; PhD, Oklahoma State University, 1969; PE
- Graham, William Doyce, Jr., *Chair and Professor of Crop and Soil Environmental Science*. BS, Texas Technological College, 1962; MS, 1965, PhD, 1967, Purdue University
- Gramopadhye, Anand Krishna, *Associate Professor of Industrial Engineering*. BE, Victoria Jubilee Technical Institute, University of Bombay (India), 1987; MS, 1989, PhD, 1992, State University of New York-Buffalo
- Grant, Harry Roger, *Chair of Department of History; Professor of History*. BA, Simpson College, 1966; MA, 1967, PhD, 1970, University of Missouri-Columbia
- Grant, Michael Maurice, *Instructor in Graphic Communications*. BS, 1994, MEd, 1996, Clemson University
- Grant, Peter Michael, *Adjunct Assistant Professor of Entomology*. BS, Pennsylvania State University, 1975; MS, North Texas State University, 1978; PhD, Florida State University, 1985
- Granville, Johanna Cushing, *Assistant Professor of Political Science*. BA, Amherst College, 1986; MALD, Fletcher School of Law and Diplomacy, 1989; PhD, Tufts University, 1992
- Gray, Barry M., *Adjunct Professor, GHS/UC Biomedical Cooperative*. AB, Dartmouth College, 1969; MD, Pennsylvania State University College of Medicine, 1973
- Green, Herman George, *Director of the Center for the Study of Black Experience in Higher Education; Professor of Curriculum and Instruction*. BS, South Carolina State College, 1959; MEd, 1970, PhD, 1975, University of Illinois
- Green, Penny Anton, *Assistant Professor of Sociology*. BS, Louisiana State University, 1972; MA, University of New Orleans, 1974; PhD, University of Texas, 1986
- Green, Robert Phillip, Jr., *Professor of Educational Foundations and Special Education*. BA, University of the South, 1970; MA, 1972, EdD, 1977, University of Virginia
- Greene, Annel Kay, *Associate Professor of Animal and Veterinary Sciences*. BS, 1982, MS, 1985, Louisiana State University; PhD, Mississippi State University, 1988
- Greene, Charla Bradshaw, *Instructor of English*. BA, 1991, MA, 1997, University of North Carolina
- Greenstein, Joel Sander, *Associate Professor of Industrial Engineering*. BS, University of Illinois, 1973; MS, Stanford University, 1974; PhD, University of Illinois, 1979
- Gregory, Richard Victor, *Director, School of Textiles, Fibers, and Polymer Science; Associate Professor of Textiles*. BS, Old Dominion University, 1980; PhD, Clemson University, 1984
- Gresham, Charles Arthur, *Associate Professor of Forest Resources, Belle W. Baruch Forest Science Institute*. BS, University of Georgia, 1970; MS, 1972, PhD, 1975, Duke University
- Griffin, Barbara Lee, *Professor of Counseling*. BSW, Florida State University, 1967; MEd, Indiana University of Pennsylvania; PhD, Florida State University, 1979
- Griffin, Randall Parrish, *Professor of Entomology*. BS, 1971, MS, 1973, Clemson University
- Grigsby, David Wayne, *Chair and Professor of Management*. BBA, Baylor University, 1968; MBA, The Citadel, 1975; PhD, University of North Carolina, 1980
- Grimes, Lawrence Wade, *Professor of Experimental Statistics*. BS, 1972, MS, 1974, University of Georgia; PhD, Ohio State University, 1978

- Grosby, Steven Elliott, *Assistant Professor of Religion*. PhD, University of Chicago, 1989
- Grossman, Harold Charles, *Acting Chair and Associate Professor of Computer Science*. BS, University of Cincinnati, 1968; MS, New Mexico State University, 1971; PhD, Michigan State University, 1978
- Grove, Harold Jesse, *Associate Professor of Parks, Recreation, and Tourism Management*. BS, 1961, MEd, 1963, Pennsylvania State University
- Grove, Stephen John, *Associate Professor of Marketing*. BA, 1972, MA, 1975, Texas Christian University; PhD, Oklahoma State University, 1979
- Grubb, Charles Alan, *Associate Professor of History*. BA, Washington and Lee University, 1963; MA, 1964, PhD, 1969, Columbia University
- Gruber, Helen E., *Adjunct Professor, GHS/CU Biomedical Cooperative*. BS, University of Idaho, 1969; MS, 1974, PhD, 1976, Oregon State University
- Grujicic, Mica, *Professor of Mechanical Engineering and Materials Engineering*. BEng, 1975, MEng, 1978, Belgrade University; PhD, Massachusetts Institute of Technology, 1983
- Guse, Neal Gregory, *Adjunct Professor of Parks, Recreation, and Tourism Management*. BS, Humboldt State College, 1959; MS, Colorado State University, 1966
- Guyann, David Clair, Jr., *Professor of Forest Resources*. BS, 1968, MS, 1973, PhD, 1975, Virginia Polytechnic Institute and State University
- Haile, James Mitchell, *Professor of Chemical Engineering*. BS, Vanderbilt University, 1968; ME, 1974, PhD, 1976, University of Florida
- Halberstadt, Craig R., *Adjunct Associate Professor, GHS/CU Biomedical Cooperative*. BS, 1983, MS, 1986, PhD, 1991, University of Michigan
- Haley-Zitlin, Vivian Jean, *Assistant Professor of Food Science*. BS, University of Kentucky, 1977; PhD, University of Tennessee, 1991
- Halfacre, Robert Gordon, *Alumni Distinguished Professor of Horticulture*. BS, 1963, MS, 1965, Clemson University; PhD, Virginia Polytechnic Institute and State University, 1968; MLA, North Carolina State University, 1973
- Haliene, Rita Mae, *Instructor of Food Science*. BS, Ohio State University, 1975; MS, Ball State University, 1982
- Hall, Basil Edwin, *Lecturer in Design Shop*. BA, Furman University, 1969; MEd, Clemson University, 1990
- Hall, Michelle Ann, *Extension Associate/Assistant Professor of Animal and Veterinary Sciences*. BS, 1975, MS, 1977, PhD, 1982, University of Wisconsin
- Hallahan, Mark, *Assistant Professor of Psychology*. BA, Amherst College, 1988; MA, 1993, PhD, 1995, Harvard University
- Halone, Kelby Kenneth, *Assistant Professor of Speech*. BA, Concordia College, 1991; MA, Kansas State University, 1993; PhD, University of Oklahoma, 1998
- Ham, Donald Lee, *Professor of Forest Resources*. BA, William Jewell College, 1965; ME, 1967, PhD, 1971, Duke University
- Hamel, Paul B., *Adjunct Assistant Professor of Forest Resources*. BS, 1970, MS, 1973, Michigan State University; PhD, Clemson University, 1981
- Hamilton, David, *Visiting Instructor of German*. BS, 1985, BA, 1986, Clemson University
- Hammig, Michael Dean, *Professor of Agricultural and Applied Economics*. BA, University of Kansas, 1967; PhD, Washington State University, 1978
- Hammit, William Edgar, *Professor of Parks, Recreation, and Tourism Management*. BS, Bluffton College, 1965; BS, 1968, ME, 1969, PhD, 1978, University of Michigan
- Hammond, Robert Gordon, *Lecturer in Biosystems Engineering*. BS, Clemson University, 1977
- Han, Bongtae, *Assistant Professor of Mechanical Engineering*. BS, 1981, MS, 1983, Seoul National University (Korea); PhD, Virginia Polytechnic Institute and State University, 1991
- Han, Young Jo, *Professor of Biosystems Engineering*. BS, 1979, MS, 1981, Seoul National University; PhD, University of Illinois, 1986; PE
- Hanlin, Hugh G., *Adjunct Associate Professor of Forest Resources*. BS, 1972, MS, 1975, Auburn University; PhD, Oregon State University, 1980
- Hanna, Marion Lee, Jr., *Visiting Instructor of Mathematical Sciences*. BS, 1994, MS, 1996, Clemson University
- Hanson, William Roderick, *Chair and Professor of Military Science*. LTC, U.S. Army, BA, Oregon State University, 1980; MS, University of Southern California, 1991
- Haque, Imtiaz-Ul, *Professor of Mechanical Engineering*. BS, University of Engineering and Technology (Pakistan), 1971; MS, 1977, PhD, 1982, Clemson University
- Haque, Mary Taylor, *Professor of Horticulture*. BA, Sweet Briar College, 1973; MLA, North Carolina State University, 1978
- Harder, Lillian Utsey, *Director, Brooks Center for the Performing Arts; Professor of Music*. BA, Coker College, 1965; MN, Converse College, 1967
- Hardesty, Nancy Ann, *Associate Professor of Religion*. BA, Wheaton College, 1963; MSJ, Northwestern University, 1964; PhD, University of Chicago, 1976
- Hardin, Karen Phillips, *Lecturer in School of Nursing*. BSN, 1976, MSN, 1979, Clemson University
- Harding, Crystal Anne, *Lecturer in Speech*. BA, 1992, MA, 1994, Kansas State University
- Hare, Eleanor O'Meara, *Associate Professor of Computer Science*. BA, Hollins College, 1958; MS, 1973, PhD, 1990, Clemson University
- Hare, William Ray, Jr., *Professor of Mathematical Sciences*. BS, Henderson State Teachers College, 1957; MS, 1959, PhD, 1961, University of Florida
- Harlow, Richard Fessenden, *Adjunct Associate Professor of Forest Resources*. BS, 1947, MS, 1948, University of Maine; MS, Virginia Polytechnic Institute and State University, 1971; PhD, Clemson University, 1991
- Harmon, Karen Scherwitz, *Research Associate/Assistant Professor of Food Science*. BS, University of Wisconsin, 1981; PhD, University of Minnesota, 1986
- Harms, William Robert, *Adjunct Associate Professor of Forest Resources*. BS, 1952, ME, 1956, Pennsylvania State University; PhD, Duke University, 1961
- Harrell, William Rodney, *Assistant Professor of Electrical and Computer Engineering*. BS, 1981, MS, 1983, University of Kentucky; PhD, University of Maryland, 1994
- Harrill, Andrea Lynn, *Lecturer of Public Health*. BS, 1994, MEd, 1995, Clemson University
- Harris, Harold Monroe, *Professor of Agricultural and Applied Economics*. BS, 1961, MS, 1965, Auburn University; PhD, Purdue University, 1971
- Harris, John Manville, Jr., *Associate Professor of Finance*. BS, 1973, MBA, 1975, PhD, 1980, University of South Carolina
- Harris, Rebecca Suzanne, *Lecturer in Industrial Education*. BS, Clemson University, 1991
- Harris, Robert James, *Adjunct Assistant Professor of Parks, Recreation, and Tourism Management*. BA, Macquarie University (Australia), 1985; MBA, University of Technology (Australia), 1992
- Harris, Scott Kyle, *Lecturer in Spanish*. BA, 1980, MAT, 1985, University of South Carolina
- Harrison, James William, Jr., *Professor of Electrical and Computer Engineering*. BS, University of Florida, 1959; MS, 1966, PhD, 1972, North Carolina State University
- Harrison, Robert Edwards, *Adjunct Assistant Professor of Biosystems Engineering*. BS, 1978, MS, 1980, PhD, 1991, Clemson University
- Harritos, Harry Charles, *Associate Professor of Architecture*. BS, 1969, MArch, 1979, Clemson University; AIA
- Hart, Lillian Blake, *Associate Professor of Curriculum and Instruction*. BS, Agnes Scott College, 1960; MEd, University of North Carolina, 1962; PhD, University of South Carolina, 1973
- Hartel, Peter G., *Adjunct Associate Professor of Crop and Soil Environmental Science*. BS, University of Alaska, 1972; BS, University of Washington, 1976; PhD, Oregon State University, 1984
- Hartmann, David James, *Associate Professor of Theatre*. BFA, University of Wisconsin, 1982; MFA, University of Minnesota, 1986
- Hartmann, Dieter Herman, *Associate Professor of Physics*. BA, M, 1982, University of Göttingen (Germany); PhD, University of California, 1989
- Hassell, Richard L., *Assistant Professor of Horticulture*. BS, Brigham Young University, 1977; MS, Cornell University, 1979; PhD, Ohio State University, 1993
- Hatfield, Emma Nora, *Lecturer in School of Nursing*. BS, 1968, MA, 1972, State University of New York
- Hatfield, Maryellen Brown, *Adjunct Assistant Professor of Nursing*. BSN, West Virginia University, 1979; MN, University of South Carolina, 1980
- Havice, William Lester, *Professor of Technology and Human Resource Development*. BS, 1977, MS, 1979, Fort Hays State University; EdS, Pittsburg State University, 1984; PhD, Kansas State University, 1994
- Hawdon, James Edward, *Associate Professor of Sociology*. BA, Pennsylvania State University, 1985; MA, 1988, PhD, 1992, University of Virginia
- Hawes, Robert Holbrook, *Adjunct Professor of Bioengineering*. AB, Indiana University, 1976; MD, Indiana University School of Medicine, 1980
- Hay, Karen June, *Lecturer in Computer Science*. BS, University of Iowa, 1985; MS, 1986, PhD, 1993, University of Arizona
- Hayasaka, Steven Shin, *Chair and Professor of Microbiology and Molecular Medicine*. BS, Pennsylvania State University, 1969; MS, 1972, PhD, 1975, Oregon State University
- Hayes, John Charles, *Chair and Professor of Biosystems Engineering*. BS, 1974, MS, 1976, Clemson University; PhD, University of Kentucky, 1979; PE
- Haymond, Jacqueline Landis, *Associate Professor of Forest Resources*. BS, Erskine College, 1971; MS, 1978, PhD, 1985, Clemson University
- Hays, Ruth Lanier, *Professor of Zoology*. BA, Berea College, 1962; PhD, Auburn University, 1966
- Hayter, Earl Joseph, *Associate Professor of Civil Engineering*. BS, Florida Institute of Technology, 1976; MS, 1979, PhD, 1983, University of Florida
- Headley, Kathy Neal, *Associate Professor of Curriculum and Instruction*. BA, 1974, MEd, 1976, University of Georgia; EdD, Auburn University, 1987
- Hearn, Elizabeth Roberts, *Director of Enrollment; Lecturer in Nursing*. BS, 1982, MS, 1984, Clemson University
- Heckel, David Goodwin, *Professor of Zoology*. BA, University of Rochester, 1975; PhD, Stanford University, 1980
- Hedden, Roy Leslie, *Professor of Forest Resources*. BSFR, 1971, MS, 1972, PhD, 1976, University of Washington
- Hedetniemi, Sandra Mitchell, *Professor of Computer Science*. BA, Centre College of Kentucky, 1971; MS, 1973, PhD, 1977, University of Virginia
- Hedetniemi, Stephen Travis, *Professor of Computer Science*. BS, 1960, MS, 1962, PhD, 1966, University of Michigan
- Heifferon, Barbara Ann, *Assistant Professor of English*. BA, 1993, MA, 1994, PhD, 1995, University of Arizona
- Heikkila, Steven James, *Visiting Instructor of Philosophy*. BA, Appalachian State University, 1989; MA, 1992, PhD, 1997, University of Georgia

- Heimke, Gunther Ferdinand, *Adjunct Professor of Bioengineering*. BS, 1951, MS, 1953, PhD, 1959, University of Halle (Germany)
- Helms, Doris Reiting, *Professor of Biology*. BS, Bucknell University, 1967; PhD, University of Georgia, 1973
- Helsel, Beth, *Librarian*. BA, University of Oklahoma, 1965; MLS, University of California, 1971
- Henderson, Hoke Frederick, *Adjunct Associate Professor of Medical Technology, Baptist Medical Center*. BA, Yale University, 1964; MD, University of North Carolina, 1968
- Henricks, Donald Maurice, *Chair of Animal and Veterinary Sciences; Professor of Animal Science*. BS, University of Missouri, 1957; MS, Purdue University, 1961; PhD, University of Missouri, 1965
- Henry, Mark Scott, *Professor of Agricultural and Applied Economics*. BA, Baker University, 1968; PhD, Kansas State University, 1973
- Henson, John Michael, *Adjunct Professor of Environmental Engineering and Science*. BS, University of South Carolina, 1975; MS, Clemson University, 1978; PhD, University of Florida, 1983
- Hepp, Gary Richard, *Adjunct Assistant Professor of Wildlife*. BS, Ohio State University, 1973; MS, Clemson University, 1977; PhD, North Carolina State University, 1982
- Herrndon, Joseph Earl, *Adjunct Assistant Professor of General Engineering*. BS, Clemson University, 1956; MPH, University of Minnesota, 1961
- Hester, Katrina Holliday, *Instructor of English*. BA, Furman University, 1996; MA, Clemson University, 1998
- Hetherington, Jay A., *Visiting Instructor of Political Science*. BS, Miami University, 1962
- Heusinkveld, Paula Rae, *Professor of Spanish*. BA, Central College, 1968; MA, 1969, PhD, 1979, University of Wisconsin
- Hilderman, Richard Harold, *Professor of Biochemistry and of Molecular Medicine*. BS, Jamestown College, 1966; PhD, University of Missouri, 1972
- Hill, Hoke Smith, Jr., *Chair and Professor of Experimental Statistics*. BS, The Citadel, 1971; MS, 1974, PhD, 1979, Clemson University
- Hill, Trent Gregory, *Assistant Professor of English*. AB, 1985, MA, 1988, PhD, 1993, Duke University
- Hilligoss, Susan Jane, *Associate Professor of English*. BA, University of Michigan, 1970; MA, 1971, PhD, 1977, University of Pennsylvania
- Hinnant, Charles William, Jr., *Adjunct Assistant Professor of Microbiology*. BS, Clemson University, 1983; MD, Medical University of South Carolina, 1986
- Hipps, Opal Shepard, *Professor in School of Nursing*. BSN, 1960, MSN, 1964, University of North Carolina; EdD, University of South Carolina, 1976
- Hirt, Douglas Edward, *Associate Professor of Chemical Engineering*. BS, 1982, MS, 1984, Virginia Polytechnic Institute and State University; PhD, Princeton University, 1990
- Hochkeppel, Heinz-Kurt, *Biomedical Professor, GHS/CU Biomedical Cooperative*. BS, 1968, PhD, 1972, University of Cologne (Germany)
- Hodge, Janie Pate, *Assistant Professor of Special Education*. BS, Memphis State University, 1976; MEd, University of North Alabama, 1983; PhD, Vanderbilt University, 1995
- Hoefner, Steven L., *Research Associate/Assistant Professor of Clemson Environmental Technologies Laboratory*. BS, Colorado School of Mines, 1978; PhD, University of Missouri-Columbia, 1983
- Hoffman, Kevin Michael, *Visiting Lecturer in Biology*. BS, Bowling Green State University, 1979; MS, Ohio State University, 1983; PhD, Clemson University, 1992
- Hogan, Robert John, *Professor of Architecture*. BArch, 1974, MArch, 1976, Virginia Polytechnic Institute and State University
- Holbrook, Flint, *Adjunct Lecturer in Biosystems Engineering*. BS, 1980, MS, 1986, Clemson University
- Holder, Barbara Jean, *Associate Professor in School of Nursing*. BS, 1975, MA, 1976, PhD, 1986, New York University
- Hollenberg, Frank Kim, *Visiting Lecturer in Biology*. BA, University of Missouri, 1979; PhD, Clemson University, 1992
- Holley, Edward Jens, *Head, Resource Sharing and Copier Services; Associate Librarian*. BA, Furman University, 1981; MLS, University of North Carolina, 1983
- Holliday, J. Ray, *Instructor of Agricultural Education*. BS, 1981, MS, 1985, Clemson University
- Holmes, Paul Thayer, *Professor of Mathematical Sciences*. BA, 1957, MA, 1959, Washington State University; PhD, Stanford University, 1966
- Holt, Charlotte Lane, *Research Associate in English*. BA, 1976, MA, 1987, Clemson University
- Holton, Calvin Lewis, *Instructor of English*. BA, University of South Carolina, 1985; MA, Clemson University, 1992
- Hon, David Nyok-Sai, *Professor of Forest Resources*. BS, Tokyo University of Agriculture and Technology, 1972; MS, Gunma University, 1974; PhD, Virginia Polytechnic Institute and State University, 1977
- Hood, William Michael, *Associate Professor of Entomology*. BS, 1973, MS, 1977, Clemson University; PhD, University of Georgia, 1986
- Horton, Paul Mackey, *Chair and Professor of Entomology*. BS, 1969, MS, 1973, Clemson University; PhD, Auburn University, 1981
- Horton, Robert Mark, *Assistant Professor of Math Education*. BS, University of Wisconsin-Madison, 1974; MEd, Miami University, 1983; EdD, University of Cincinnati, 1997
- Hosler, Ned Mark, *Assistant Director of Bands; Associate Professor of Music*. BME, 1976, MA, 1985, PhD, 1992, Ohio State University
- Houston, David Wallace, *Lecturer in Art and Architectural History*. BA, University of South Carolina, 1981
- Hovind, Mark Burkett, *Instructor of Speech*. BA, Ohio State University, 1978; MA, University of South Carolina, 1983; PhD, University of Oklahoma, 1995
- Howard, Gordon Edward, *Professor of Parks, Recreation, and Tourism Management*. BA, 1963, MA, 1964, University of North Carolina; PhD, University of Michigan, 1968
- Howard, Sharon Wayne, *Associate Professor of English*. BA, University of Missouri; MA, 1987, PhD, 1992, Purdue University
- Howle, David Samuel, *Adjunct Assistant Professor of Crop and Soil Environmental Science*. BS, 1975, MS, 1980, Clemson University; PhD, University of Arkansas, 1984
- Hoyle, Elizabeth Houston, *Professor of Family and Youth Development*. BS, Limestone College, 1972; MS, Winthrop College, 1977
- Hubbard, Stephen John, *Visiting Assistant Professor of Electrical and Computer Engineering*. BS, Clemson University, 1985; MS, University of Wisconsin, 1986; PhD, Georgia Institute of Technology, 1994
- Hudson, JoAnn Strine, *Lecturer in Electron Microscope Facility*. BA, Central Wesleyan College, 1985; MA, Clemson University, 1992
- Hudson, Larry Wilson, *Professor of Animal Science*. BS, Berea College, 1964; MS, 1965, PhD, 1967, University of Kentucky
- Hudson, Lester A., Jr., *Lecturer in Management*. BA, Furman University, 1961; MBA, University of South Carolina, 1965; PhD, Clemson University, 1997
- Hudson, Mark Richards, *Associate Professor of Art*. BA, 1971, MFA, 1974, Clemson University
- Hudson, Stephen J., *Adjunct Assistant Professor, GHS/CU Biomedical Cooperative*. BS, Pepperdine University, 1982; MS, University of Illinois-Urbana-Champaign, 1985; PhD, University of Miami, 1992
- Hudson, William Garraux, *Adjunct Professor of Mechanical Engineering*. BS, Clemson Agricultural College, 1946; MS, Clemson University, 1957; MS, University of Michigan, 1965
- Huey, Cecil Oates, Jr., *Professor of Mechanical Engineering*. BS, 1965, MSME, 1968, PhD, 1973, Clemson University; PE
- Huff, Georgia Lou, *Adjunct Assistant Professor of Medical Technology; Educational Coordinator, School of Medical Technology, Anderson Memorial Hospital*. BS, 1967, MEd, 1973, Clemson University
- Huff, Raymond Thaddeus, *Assistant Professor of Architecture*. BArch, Clemson University, 1971; AIA
- Huffman, John William, *Professor of Chemistry*. BS, Northwestern University, 1954; MA, 1956, PhD, 1957, Harvard University
- Hughes, Robbie Blankenship, *Professor in School of Nursing*. BSN, Medical College of Georgia, 1967; MS, 1981, EdD, 1986, Clemson University
- Hughes, Thomas Alvin, *Professor of Microbiology and Crop and Soil Environmental Science*. BS, South Carolina State College, 1975; MS, 1978, PhD, 1981, North Carolina State University
- Huneycutt, Tyler Bennett III, *Lecturer in Management*. BS, U.S. Military Academy, 1964; MS, Air Force Institute of Technology, 1973
- Hunt, Patrick Garch, *Adjunct Professor of Crop and Soil Environmental Science*. BS, 1965, MS, 1966, Clemson University; PhD, University of Florida, 1970
- Hunter, Orren Franklin, Sr., *Associate Professor of Textiles*. BS, Clemson University, 1961; MS, Institute of Textile Technology, 1963
- Hupp, Harold Dean, *Professor of Animal Science*. BS, Wilmington College, 1971; MS, University of Kentucky, 1973; PhD, Virginia Polytechnic Institute and State University, 1977
- Hurley, Joni Kay, *Associate Professor of Spanish*. BA, 1976, MA, 1978, PhD, 1992, University of Pittsburgh
- Hurt, Norma Jane, *Associate Professor of Architecture*. BArch, Pennsylvania State University, 1970; MEnvDes, Yale University, 1972; PhD, University of Nottingham, 1986
- Husson, Scott Michael, *Assistant Professor of Chemical Engineering*. BS, Pennsylvania State University, 1993; PhD, University of California, 1998
- Hust, Carl Marlowe, *Adjunct Associate Professor of Parks, Recreation, and Tourism Management*. BS, Furman University, 1959
- Hutton, Dale Jovan, *Associate Professor of Architecture*. BArch, Texas A&M University, 1960; MArch, Columbia University, 1961
- Hutton, William Cochrane, *Adjunct Professor of Bioengineering*. BS, University of Strathclyde, 1962; MS, 1963, PhD, 1984, University of Birmingham
- Hwu, Shiou-Jyh, *Associate Professor of Chemistry*. BS, Fu-Jen Catholic University, 1978; PhD, Iowa State University, 1985
- Hyman, Vera, *Adjunct Associate Professor of Medical Technology; McLeod Regional Medical Center*. BA, University of South Carolina, 1954; MD, Medical University of South Carolina, 1969
- Hyssell, David Lee, *Associate Professor of Physics*. BS, Pennsylvania State University, 1987; PhD, Cornell University, 1992
- Ingram, Samuel Turner, *Professor of Graphic Communications*. BA, Appalachian State University, 1978; MEd, 1982, EdD, 1985, Clemson University
- Ioannou, Ioannis, *Lecturer in Architecture*. BA, University of Maryland, 1994; MA, Clemson University, 1997

- Isbell, Clinton Howard**, *Professor of Technology and Human Resource Development*. BA, 1969, MEd, 1974, Sam Houston State University; EdD, Texas A&M University, 1980
- Isely, John Jeffery**, *Associate Professor of Aquaculture, Fisheries, and Wildlife*. BS, University of Michigan, 1979; BS, Kent State University, 1979; MA, Southern Illinois University, 1981; PhD, Texas A&M, 1984
- Isherwood, Matthew Lee**, *Research Associate/Assistant Professor of Chemistry*. BSc, 1994, PhD, 1997, University of Manchester Institute of Science and Technology
- Jackson, David Michael**, *Adjunct Professor of Entomology*. BS, Michigan State University, 1971; MS, 1975, PhD, 1978, Washington State University
- Jackson, Debra Broadwell**, *Acting Dean of Graduate School and Assistant Vice Provost for Research; Professor of Public Health*. BSN, Medical University of South Carolina, 1971; MN, Emory University, 1975; PhD, Georgia State University, 1983
- Jackson, Herman Brown, Jr.**, *Head of Plant Industry Department; Lecturer in Entomology*. BS, Clemson University, 1964; MS, Auburn University, 1966; PhD, Oklahoma State University, 1971
- Jacobi, Martin James***, *Professor of English*. BA, Canisius College, 1971; MA, 1979, PhD, 1984, University of Oregon
- Jacobs, David Pokrass**, *Associate Professor of Computer Science*. BA, DePauw University, 1971; MS, Georgia Institute of Technology, 1981; PhD, University of Missouri, 1976
- Jacques, Annmarie Havenga**, *Lecturer in Architecture*. BA, 1976, MArch, 1981, Clemson University, AIA
- Jacques, John David**, *Professor of Architecture*. BArch, Clemson University, 1970; MPhil, University of Edinburgh, 1975; AIA
- Jahn, Judson Robert**, *Lecturer in Legal Studies*. BS, Limestone College, 1991; JD, Mercer University, 1994
- James, Ann Elizabeth**, *Chair and Professor of Parks, Recreation, and Tourism Management*. BS, Bowling Green State University, 1964; MS, University of North Carolina, 1971; PhD, University of New Mexico, 1978
- James, Willie Romando***, *Associate Professor of Family and Youth Development*. BS, Florida A&M University, 1960; MS, Jersey City State College, 1968; PhD, Clark-Atlanta University, 1994
- Jamison, Robert Edward**, *Professor of Mathematical Sciences*. BS, Clemson University, 1970; MS, 1973, PhD, 1974, University of Washington
- Jantzen, Carol**, *Adjunct Professor of Ceramic and Materials Engineering*. BS, 1967, MS, 1970, City University of New York; PhD, State University of New York, 1978
- Jarvis, Christine Woodruff**, *J. E. Sirrine Professor of Textiles*. BS, University of North Carolina, 1971; PhD, Massachusetts Institute of Technology, 1975
- Jarvis, James Patrick**, *Chair and Professor of Mathematical Sciences*. BS, University of North Carolina, 1971; MS, 1973, PhD, 1975, Massachusetts Institute of Technology
- Jeanes, Robert Nelson**, *Lecturer in Physics*. BS, Presbyterian College, 1961; MInEd, Clemson University, 1979
- Jeffers, Steven Nye**, *Assistant Professor of Plant Pathology*. BS, University of California-Davis, 1976; MS, 1980, PhD, 1985, Cornell University
- Jeffries, Clark Debs***, *Professor of Mathematical Sciences*. BS, 1967, MS, 1968, University of Washington; PhD, University of Toronto, 1971
- Jenkins, Thomas Charles**, *Professor of Animal Science*. BS, 1973, MS, 1975, Pennsylvania State University; PhD, Cornell University, 1979
- Jiang, Huabei**, *Assistant Professor of Physics and Astronomy; Adjunct Assistant Professor, GHSC/UC Biomedical Cooperative*. BS, 1984, PhD, 1988, University of Electronic Science and Technology of China; PhD, Dartmouth College, 1995
- Johns, Don Herbert**, *Adjunct Associate Professor of Packaging Science*. BS, 1948, MS, 1951, PhD, 1953, University of Wisconsin
- Johnson, Albert Wayne**, *Professor of Entomology, Pee Dee Research and Education Center*. BS, 1966, MS, 1968, Clemson University; PhD, Auburn University, 1971
- Johnson, Arthur Albin**, *Adjunct Professor Zoology*. BA, University of Minnesota, 1950; MS, 1952, PhD, 1955, University of Illinois
- Johnson, James Allen, Jr.**, *Adjunct Associate Professor of Health Administration*. BA, University of Maryland, 1978; MPA, Auburn University, 1982; PhD, Florida State University, 1987
- Johnson, Jon Robert**, *Assistant Professor of Horticulture, Sandhill Research and Education Center*. BS, 1977, MS, 1979, Ohio State University; PhD, University of Illinois, 1982
- Johnson, Steven David**, *Associate Librarian*. BSFS, Georgetown University, 1968; MLS, Rutgers University, 1973
- Jones, Alfred**, *Adjunct Professor of Horticulture*. BS, Virginia Polytechnic Institute and State University, 1953; MS, 1957, PhD, 1961, North Carolina State University
- Jones, Michael A.**, *Assistant Professor of Crop and Soil Environmental Science*. BS, 1989, MS, 1991, PhD, 1994, North Carolina State University
- Jones, Steven Monroe**, *Adjunct Assistant Professor of Forest Resources*. BS, 1972, MS, 1974, Southern Illinois University; PhD, Clemson University, 1988
- Jones, Victor Jonathan**, *Assistant Professor of Architecture*. BArch, California Polytechnic Institute, 1991; MArch, Harvard University, 1995
- Jones, Walker Alexander**, *Adjunct Professor of Entomology*. BA, University of Mississippi, 1973; MS, 1976, PhD, 1979, Clemson University
- Jordan, Johnny Wayne**, *Professor of Agricultural and Applied Economics*. BS, 1969, MS, 1971, Auburn University; PhD, Clemson University, 1978
- Joseph, Paul Faris**, *Associate Professor of Mechanical Engineering and Engineering Mechanics*. BA, Franklin and Marshall College, 1979; MS, 1982, PhD, 1987, Lehigh University
- Josey, James Larry**, *Associate Professor of Civil Engineering*. BS, Mississippi State University, 1956; MS, Louisiana State University, 1958; PhD, Mississippi State University, 1971; PE
- Juang, Chang Hsein**, *Professor of Civil Engineering*. BS, 1974, MS, 1976, National Cheng Kung University; PhD, Purdue University, 1981; PE
- Kahl, Kandice Helenne**, *Professor of Agricultural and Applied Economics*. BS, College of William and Mary, 1973; ME, 1974, PhD, 1975, North Carolina State University
- Kaiser, Eddie Howards**, *Associate Professor of Agricultural and Applied Economics*. BS, University of Illinois, 1972; PhD, Iowa State University, 1979
- Kaminski, Rebecca Anne**, *Assistant Professor of Curriculum and Instruction*. BS, West Virginia University, 1971; MEd, 1974, EdD, 1994, University of Pittsburgh
- Kanet, John Joseph**, *Burlington Professor of Management*. BS, Lehigh University, 1967; MBA, Loyola College, 1971; PhD, Pennsylvania State University, 1979
- Kaplan, Alan**, *Assistant Professor of Computer Science*. BS, Duke University, 1983; MS, 1989, PhD, 1996, University of Massachusetts
- Karanfil, Tanju**, *Assistant Professor of Environmental Engineering and Science*. BS, Istanbul Technical University, 1988; MS, 1991, PhD, 1995, University of Michigan
- Karau, Steven James**, *Visiting Assistant Professor of Psychology*. BS, Arizona State University, 1987; MS, 1990, PhD, 1993, Purdue University
- Karlen, Douglas Lawrence**, *Adjunct Associate Professor of Crop and Soil Environmental Science*. BS, University of Wisconsin, 1973; MS, Michigan State University, 1975; PhD, Kansas State University, 1978
- Karush, Deborah**, *Visiting Assistant Professor of English*. BA, Princeton University, 1988; PhD, Yale University, 1996
- Kasperbauer, Michael John**, *Adjunct Professor of Plant Pathology and Physiology*. BS, 1954, PhD, 1961, Iowa State University
- Katsiyannis, Antonis**, *Associate Professor of Special Education*. BA, Hellenic College, 1983; MEd, Virginia Commonwealth University, 1986; EdD, College of William and Mary, 1991
- Keinath, Anthony Perry**, *Associate Professor of Plant Pathology and Physiology, Coastal Research and Education Center*. BS, Michigan State University, 1982; MS, 1985, PhD, 1988, Cornell University
- Keinath, Thomas Michael**, *Dean, College of Engineering and Science; Professor of Environmental Engineering and Science*. BSE, 1963, MSE, 1964, PhD, 1968, University of Michigan
- Keller, Don Frederick**, *Chair and Professor of Counseling*. BS, 1962, MA, 1968, Southeast Missouri State College; EdD, Indiana University, 1973
- Kelley, Robin N.**, *Biomedical Associate Professor, GHSC/UC Biomedical Cooperative; Associate Director of Ambulatory Pediatrics, Greenville Hospital System*. BS, Clemson University, 1982; MD, University of South Carolina, 1986
- Kelly, Janet Marie**, *Associate Professor of Political Science*. BS, College of Charleston, 1980, MPA, University of South Carolina and College of Charleston, 1983; PhD, Wayne State University, 1992
- Kelly, John W.**, *Biomedical Associate Professor, GHSC/UC Biomedical Cooperative; Associate Director, Department of Medicine, Greenville Hospital System*. BS, 1977, MD, 1981, University of Mississippi
- Kelly, John William**, *Vice President for Public Service and Agriculture; Professor of Horticulture*. BS, Clemson University, 1977; MS, 1979, PhD, 1982, Ohio State University
- Kemper, Karen Ann**, *Associate Professor of Health Science*. BS, 1983, MS, 1986, PhD, 1992, University of South Carolina
- Kendall, Ronald James**, *Director, Institute of Wildlife and Environmental Toxicology; Professor of Environmental Toxicology*. BS, University of South Carolina, 1974; MS, Clemson University, 1976; PhD, Virginia Polytechnic Institute and State University, 1980
- Kennedy, John Maurice**, *Associate Professor of Mechanical Engineering and Engineering Mechanics*. BS, 1975, MS, 1977, Virginia Polytechnic Institute and State University; PhD, Clemson University, 1984
- Kennedy, William Joseph**, *Professor of Industrial Engineering*. BA, Whitman College, 1960; MS, U.S. Naval Post-Graduate School, 1966; PhD, Virginia Polytechnic Institute and State University, 1971; PE
- Kesden, Gregory Michael**, *Lecturer in Computer Science*. BS, 1996, MS, 1998, Clemson University
- Kessler, George Donald**, *Professor of Forest Resources*. BS, 1965, MS, 1967, PhD, 1971, University of Georgia
- Key, Jennifer Denise***, *Professor of Mathematical Sciences*. BSc, Witwatersrand University (South Africa), 1963; MPhil, 1967, PhD, 1969, University of London
- Khalilian, Ahmad**, *Professor of Biosystems Engineering, Edisto Research and Education Center*. BS, University of Tehran, 1971; MS, University of California, 1977; PhD, Oklahoma State University, 1980
- Kholodenko, Arkady Leonidovich**, *Associate Professor of Chemistry*. MS, Kiev State University, 1976; PhD, University of Chicago, 1982
- Kiessler, Peter Charles**, *Associate Professor of Mathematical Sciences*. BS, 1977, MS, 1980, PhD, 1983, Virginia Polytechnic Institute and State University

- Kilbey, Sidney Michael II, *Assistant Professor of Chemical Engineering*. BS, 1990, PhD, 1995, University of Minnesota
- Kilgo, John C., *Adjunct Assistant Professor of Forest Resources*. BS, Wofford College, 1979; MS, University of Florida, 1992; PhD, University of Georgia, 1996
- Kilgore, Michael Wayne, *Research Associate/Assistant Professor of Molecular Medicine, GHS/UC Biomedical Cooperative*. BS, 1980, MS, 1984, University of Texas; PhD, Texas Tech University Health Science Center, 1990
- Kim, Byung-Joon, *Adjunct Associate Professor of Environmental Engineering and Science*. BS, Seoul National University, 1970; MS, 1976, PhD, 1981, Polytechnic University
- Kim, Yong-Cheol, *Associate Professor of Finance*. BA, Seoul National University, 1972; MA, 1982, PhD, 1987, Ohio State University
- Kimber, Delbert Lee, *Chair and Professor of Industrial Engineering*. BSE, University of South Florida, 1976; MS, 1978, PhD, 1980, Virginia Polytechnic Institute and State University; PE
- King, Donnie Ray, *Associate Professor of Family and Youth Development*. BS, 1977, MS, 1984, Clemson University; PhD, Ohio State University, 1990
- King, Gerald W., *Biomedical Professor, GHS/UC Biomedical Cooperative; Staff/Clinical Instructor, Cancer Treatment Center, Greenville Hospital System*. MD, Medical University of South Carolina, 1966
- King, Samuel Carl, *Chair, Department of Languages; Associate Professor of Spanish*. BA, 1966, MA, 1969, PhD, 1971, Louisiana State University
- Kirk, James Philip, *Adjunct Assistant Professor of Fisheries*. BS, 1970, MS, 1974, PhD, 1984, Auburn University
- Kishimoto, Toshiko, *Associate Professor of Japanese*. BA, Rikkyo University (Japan), 1967; MEd, University of Massachusetts, 1976
- Kishimoto, Yuji, *Professor of Architecture*. BArch, Wadsworth University, 1963; MArch, Harvard University, 1965; MEd, University of Massachusetts, 1976; AIA
- Kitaygorodskiy, Aleksandr, *Lecturer/NMR Spectroscopist in Chemistry*. MS, Moscow Physical Technical Institute (USSR), 1975; PhD, Institute of Chemical Physics, USSR Academy of Sciences (USSR), 1979
- Kittrell, Benjamin Upchurch, *Resident Director, Pee Dee Research and Education Center; Professor of Crop and Soil Environmental Science*. BS, 1960, MEd, 1969, PhD, 1975, North Carolina State University
- Klaine, Stephen James, *Professor of Environmental Toxicology*. BS, University of Cincinnati, 1979; MS, 1981, PhD, 1982, Rice University
- Klein, Joyce Fishman, *Lecturer in Public Health*. BS, Russell Sage College, 1964; MHRD, Clemson University, 1987
- Klein, Richard Alan, *Assistant Professor of Spanish*. BA, Sarah Lawrence College, 1977; MA, Ohio University, 1992; MA, 1994, PhD, 1998, Princeton University
- Klein, Richard Harold, *Associate Professor of Finance*. BA, City College of New York, 1960; MBA, Dartmouth College, 1962; PhD, University of Texas, 1969
- Kline, Ellis Lee, *Professor of Microbiology*. BS, Greenville College, 1964; MS, Northern Illinois University, 1968; PhD, University of California, 1972
- Kluepfel, Daniel Albert, *Associate Professor of Plant Pathology and Physiology*. BA, University of Missouri, 1978; PhD, University of Florida, 1984
- Knap, Halina Teresa, *Professor of Crop and Soil Environmental Science*. BS, 1968, MS, 1970, PhD, 1974, Academy of Agriculture (Poland)
- Knight, Marilyn Broome, *Instructor of English*. BA, University of South Carolina, 1978; MA, Clemson University, 1991; PhD, University of Georgia, 1997
- Knowles, Patricia Ann, *Associate Professor of Marketing*. BA, Michigan State University, 1976; MA, 1980, PhD, 1987, Bowling Green State University
- Kohl, Michael Francis, *Head, Special Collections; Librarian*. BA, 1971, MA, 1973, MS, 1974, MBA, 1979, University of Wisconsin
- Kolis, Joseph William, *Professor of Chemistry*. BS, Worcester Polytechnic Institute, 1979; PhD, Northwestern University, 1984
- Komo, John Joseph, *Professor of Electrical and Computer Engineering*. BSEE, 1962, MSEE, 1963, PhD, 1966, University of Missouri
- Koochoi, Jorge Antonio, *Instructor of Spanish*. BA, University of Lima (Peru), 1986; BA, University of North Carolina-Charlotte, 1994; MA, University of Iowa, 1997
- Koon, George William, *Professor of English*. BA, Newberry College, 1964; MA, Auburn University, 1966; PhD, University of Georgia, 1973
- Kosinski, Robert Joseph, *Professor of Biology*. BS, Seton Hall University, 1972; PhD, Rutgers University, 1977
- Kostreva, Michael Martin, *Professor of Mathematical Sciences*. BA, Clarion State College, 1971; MS, 1973, PhD, 1976, Rensselaer Polytechnic Institute
- Krause, Lois Breur, *Lecturer in Geology*. BS, 1980, MAT, 1994, Fairleigh Dickinson University; PhD, Clemson University, 1996
- Kube, Lutz, *Instructor of German*. MA, Humboldt Universität Berlin (Germany), 1988; PhD, University of North Carolina, 1997
- Kuehn, Thomas James, *Professor of History*. BA, Carleton College, 1972; MA, 1973, PhD, 1977, University of Chicago
- Kuehnell, Jean Melanie, *Assistant Professor of English*. BA, Lakeland College, 1987; MFA, Wichita State University, 1990
- Kulasekera, Karunarathna Bandara, *Associate Professor of Mathematical Sciences*. BS, University of Sri Jayawardenepura (Sri Lanka), 1979; MA, University of New Brunswick (Canada), 1984; PhD, University of Nebraska, 1988
- Kunkel, Mary Elizabeth, *Professor of Food Science*. BSE, University of Central Arkansas, 1975; MS, 1976, PhD, 1979, University of Tennessee
- Kwon, Ojin, *Research Associate/Visiting Assistant Professor, Center for Advanced Engineering Fibers and Films*. BS, Seoul National University (Korea), 1986; MS, University of Texas-Arlington, 1986; PhD, Virginia Polytechnic Institute and State University, 1993
- Laberge, Martine, *Associate Professor of Bioengineering; Adjunct Associate Professor, GHS/UC Biomedical Cooperative*. DEC, College de Jonquiere, 1978; BS, University of Montreal, 1983; BS, MSc, Ecole Polytechnique de Montreal, 1985; PhD, University of Montreal, 1988
- LaForge, Mary Cecile, *Associate Professor of Marketing*. BS, 1965, MBA, 1968, Samford University; PhD, University of Georgia, 1980
- LaForge, Robert Lawrence, *Alumni Distinguished Professor of Management*. BS, Clemson University, 1970; MBA, 1971, PhD, 1976, University of Georgia
- Langan, Eugene M. III, *Biomedical Associate Professor, GHS/UC Biomedical Cooperative; Associate Director of Surgery, Greenville Hospital System*. BS, 1982, MS, 1983, University of Scranton; MD, Georgetown University School of Medicine, 1987
- Lanham, Joseph Drew, *Assistant Professor of Forest Resources*. BA, 1988, MS, 1990, Clemson University
- Lanzoni, Remi Fournier, *Visiting Assistant Professor of French and Italian*. BA, University of Lyons, 1990; MA, University of South Carolina, 1992; PhD, Florida State University, 1995
- Larcom, Lyndon Lyle, *Professor of Physics and Microbiology; Adjunct Professor, GHS/UC Biomedical Cooperative*. BS, Carnegie-Mellon University, 1962; MS, 1965, PhD, 1968, University of Pittsburgh
- Lark, Julia B., *Instructor of English*. BA, 1991, MA, 1994, Clemson University
- Larsen, Miguel Folkmar, *Professor of Physics*. BS, University of Rochester, 1975; MS, 1977, PhD, 1979, Cornell University
- Laskar, Renu Chakravarti*, *Professor of Mathematical Sciences*. BA, Patna University, 1950; MA, Bihar University, 1955; PhD, University of Illinois, 1962
- Lasser, William, *Professor of Political Science*. BS, Massachusetts Institute of Technology, 1978; MA, PhD, 1983, Harvard University
- Laster, Nicole Mary, *Instructor of Speech*. BA, University of Kansas, 1991; MA, Kansas State University, 1998
- LaTorre, Jewel Gillam, *Assistant Professor of Mathematical Sciences*. BA, Coker College, 1959; MA, University of Tennessee, 1964
- Latour, Robert Adam, Jr., *Associate Professor of Bioengineering*. BS, University of Virginia, 1979; MS, 1986, PhD, 1989, University of Pennsylvania
- Law, Ernest Harry, *Professor of Mechanical Engineering and Engineering Mechanics*. BAeroE, Rensselaer Polytechnic Institute, 1962; MSE, Princeton University, 1965; PhD, University of Connecticut, 1971
- Lawson, Betsy Byrd, *Instructor of Latin*. BA, Duke University, 1959; MA, Clemson University, 1989
- Lawson, John Walter, Jr., *Visiting Assistant Professor of Mathematical Sciences*. BS, Clemson University, 1986; MS, Brown University, 1994
- Lawson, John Walter, *Professor of Microbiology*. BS, Seton Hall University, 1960; MS, 1964, PhD, 1969, University of North Carolina
- Layne, Desmond R., *Assistant Professor of Horticulture*. BS, University of Guelph (Canada), 1986; MS, 1989, PhD, 1992, Michigan State University
- Leap, Terry Lee, *Professor of Management*. BS, 1970, MPH, 1971, University of North Carolina; PhD, University of Iowa, 1978
- Leathrum, James Frederick, *Professor of Electrical and Computer Engineering*. BChE, University of Delaware, 1959; MA, 1961, PhD, 1962, Princeton University
- LeBlanc, Janet Mulholland, *Associate Professor of Art and Architectural History*. BA, 1971, MA, 1974, Michigan State University
- Lee, Andy Wu-Chung, *Professor of Forest Resources*. BS, 1968, MS, 1971, National Taiwan University; MS, 1973, PhD, 1978, Auburn University
- Lee, Burtrand Insung, *Associate Professor of Ceramic and Materials Engineering*. BA, Southern College, 1976; MA, Western Michigan University, 1979; MEng, 1985, PhD, 1986, University of Florida
- Lee, Cindy Margaret, *Assistant Professor of Environmental Engineering and Science*. BA, Indiana University, 1977; BA, University of Colorado, 1984; PhD, Colorado School of Mines, 1990
- Lee, Connie Won, *Assistant Professor in School of Nursing*. BSN, Ewha Women's University, 1978; MSN, University of Florida, 1986; EdD, University of Georgia, 1997
- Lee, Daniel Dixon, Jr., *Associate Professor of Animal and Veterinary Sciences*. BS, 1957, MS, 1964, Clemson University; PhD, North Carolina State University, 1970
- Lee, Eileen Hyde, *Adjunct Associate Professor of School of Nursing*. BSN, Boston University, 1967; MSN, University of North Carolina, 1969
- Lee, Evelyn Juanita, *Professor in School of Nursing*. BS, Berea College, 1968; MS, University of California, 1974; EdD, University of Southern California, 1984
- Lee, Hyesuk Kwon, *Assistant Professor of Mathematical Sciences*. BS, Yonsei University (Korea), 1986; MS, 1995, PhD, 1997, Virginia Polytechnic Institute and State University
- Leemhuis, Roger Phillip, *Assistant Professor of History*. BA, Villanova University, 1959; MA, University of Massachusetts, 1961; PhD, University of Wisconsin, 1970

- Leigh, Herbert Davis III, *Chair and Associate Professor of Ceramic and Materials Engineering*. BS, Louisiana Polytechnic Institute, 1966; MS, University of Missouri, 1968; PhD, University of New South Wales, 1976
- Leiningner, John Malvin, *Associate Professor of Graphic Communications and Technology and Human Resource Development*. BS, State University of New York, 1978; MInEd, 1981, EDD, 1991, Clemson University
- Leiningner, Nancy Ward, *Instructor of Graphic Communications*. BS, State University of New York, 1977; MInEd, Clemson University, 1981
- Leising, Mark David, *Associate Professor of Physics*. BS, University of Notre Dame, 1982; MS, 1985, PhD, 1987, Rice University
- Lemert, Richard Milo, *Visiting Assistant Professor of Chemical Engineering*. BS, Colorado School of Mines, 1978; MS, Lamar University, 1984; PhD, University of Texas-Austin, 1990
- Leonard, Michael Steven, *Professor of Industrial Engineering*. BIE, 1970, ME, 1972, PhD, 1973, University of Florida; PE
- Leonard, William Harold, *Professor of Curriculum and Instruction and Biology*. BA, 1964, MA, 1967, San Jose State University; PhD, University of California, 1976
- Lepetit, Daniel, *Associate Professor of French*. Certificat d'aptitude pédagogique, Education National (France), 1971; Licence es lettres, 1974, Diplôme d'aptitude, 1975, MA, 1975, University of Besancon (France); PhD, University of Toronto, 1982
- Levin, Andrew Reed, *Assistant Professor of Music*. BA, California State University, 1980; MM, Rice University, 1983; DA, Ball State University, 1993
- Lewallen, Jean, *Adjunct Assistant Professor of Medical Technology; Program Director, School of Medical Technology, McLeod Regional Medical Center*. BA, Francis Marion College, 1975
- Lew, William W., *Chair and Professor of Art*. BA, Central Washington State College, 1964; MFA, University of Oregon, 1966; PhD, Ohio University, 1976
- Lewis, Stephen Albert, *Chair and Professor of Plant Pathology and Physiology*. BS, Pennsylvania State University, 1964; MS, Rutgers University, 1969; PhD, University of Arizona, 1973
- Leyba, John David, *Adjunct Assistant Professor of Environmental Engineering and Science*. BS, Northeast Missouri State University, 1986; PhD, University of California, 1990
- Leylek, James Hagop, *Associate Professor of Mechanical Engineering*. BS, 1976, MS, 1979, PhD, 1984, University of Illinois
- Li, Guang, *Research Associate of Ceramic and Materials Engineering*. BS, South China Institute of Technology, 1982; MS, Shanghai Institute of Ceramics, 1985; PhD, Clemson University, 1995
- Li-Bleuel, Linda Lynn, *Assistant Professor of Music*. BM, University of Illinois-Urbana-Champaign, 1985; MM, 1987, DM, 1998, University of Wisconsin
- Liburdy, James Anthony, *Adjunct Professor of Mechanical Engineering*. BS, Cornell University, 1971; MS, Stanford University, 1972; PhD, Pennsylvania State University, 1976
- Lickfield, Gary Craig, *Associate Professor of Textiles*. BS, Ursinus College, 1978; PhD, Clemson University, 1983
- Liebenberg, Donald Henry, *Adjunct Professor of Physics and Astronomy*. BS, 1954, MS, 1956, PhD, 1971, University of Wisconsin
- Ligon, Walter Batchelor III, *Associate Professor of Electrical and Computer Engineering*. BS, 1987, MS, 1988, PhD, 1992, Georgia Institute of Technology
- Lindsay, Cotton Mather, J. Wilson Neuman *Professor of Economics*. BBA, University of Georgia, 1962; PhD, University of Virginia, 1968
- Ling, Robert Francis, *Professor of Mathematical Sciences*. BA, Berea College, 1961; MA, University of Tennessee, 1963; MPhil, 1968, PhD, 1971, Yale University
- Linnell, Charles Canham, *Associate Professor of Technology and Human Resource Development*. BS, 1976, MA, 1983, Appalachian State University; EDD, North Carolina State University, 1991
- Linville, Dale Edward, *Professor of Agricultural Meteorology*. BS, Purdue University, 1962; MS, University of Connecticut, 1970; PhD, Purdue University, 1972
- Lippert, Robert Mitchell, *Assistant Professor of Crop and Soil Environmental Science*. BA, Don Bosco College, 1967; BS, California Polytechnic State University, 1980; PhD, University of California, 1984
- Liska, Roger William, *Associate Dean, College of Architecture, Arts, and Humanities; Acting Chair and Professor of Construction Science and Management*. BSCE, Michigan Technological Seminary, 1968; MSCE, Wayne State University, 1967; EDD, University of Georgia, 1988
- Lloyd, Frank Thomas, *Adjunct Associate Professor of Forest Resources*. BS, 1964, MS, 1966, Virginia Polytechnic Institute and State University; PhD, North Carolina State University, 1975
- Loeb, Susan Carol, *Adjunct Assistant Professor of Forest Resources*. BA, Stanford University, 1976; MS, 1981, PhD, 1987, University of California
- Logan, Barbara Nancy, *Director and Professor in School of Nursing*. BSN, Loyola University, 1970; MSN, University of Illinois, 1972; PhD, Northwestern University, 1980
- London, James Brady, *Professor of Planning*. BS, 1971, MA, 1974, University of South Carolina; PhD, Clemson University, 1979
- Long, John Theron, *Adjunct Assistant Professor of Public Health*. BS, Western Carolina University, 1980; MS, University of South Carolina, 1983; PhD, University of Tennessee, 1990
- Long, Julie Ann, *Adjunct Assistant Professor of Animal Physiology*. BS, University of West Virginia, 1986; MS, 1989, PhD, 1994, Clemson University
- Longo, Bernadette Celia, *Assistant Professor of English*. BA, California State University-Stanislaus, 1979; MA, 1992, PhD, 1996, Rensselaer Polytechnic Institute
- Looney, Brian Boyd, *Adjunct Professor of Environmental Engineering and Science*. BS, Texas Christian University, 1978; PhD, University of Minnesota, 1983
- Louderback, Joseph Girard, *Professor of Accounting*. BS, University of Pennsylvania, 1961; MBA, Emory University, 1966; PhD, University of Florida, 1970; CPA
- Lowe, Brian James, *Adjunct Professor of Biotechnology*. BS, 1984, MS, 1986, University of Illinois; PhD, Southern Methodist University, 1990
- Lovedahl, Gerald Grey, *Chair and Professor of Technology and Human Resource Development*. BS, Berea College, 1969; MEd, Trenton State College, 1972; PhD, Ohio State University, 1977
- Lovitt, Carl Raymond, *Director of Peace Center; Associate Professor of English*. BA, Washington University, 1970; MA, University of Paris (France), 1972; PhD, University of Wisconsin, 1981
- Lowe, Rose Marie, *Lecturer in Computer Science*. MS, Georgia Institute of Technology, 1983
- Lubkeman, David Lee, *Associate Professor of Electrical and Computer Engineering*. BS, 1979, MS, 1980, PhD, 1983, Purdue University
- Luedeman, John Keith, *Professor of Mathematical Sciences and Curriculum and Instruction*. BA, Valparaiso University, 1963; MA, Southern Illinois University, 1965; PhD, State University of New York-Buffalo, 1969
- Luh, Johnson Yang-seng, *McQueen Quattlebaum Professor of Electrical and Computer Engineering*. BS, La Universidad Utopia, 1947; MS, Harvard University, 1950; PhD, University of Minnesota, 1963
- Lynn, Louis Bernard, *Adjunct Assistant Professor of Horticulture*. BS, 1970, MS, 1972, Clemson University; PhD, University of Maryland, 1975
- McAlhany, Joseph P., Jr., *Biomedical Professor, GHS/ICU Biomedical Cooperative; Academic Chair of Surgical Education, Greenville Hospital System*. BS, Furman University, 1962; MD, Bowman Gray School of Medicine, 1966
- McArthur, Jay Vaun, *Adjunct Assistant Professor of Entomology*. BS, 1977, MS, 1980, Brigham Young University; PhD, Kansas State University, 1985
- McBane, Donald Angus, *Assistant Professor of Marketing*. BS, Susquehanna University, 1968; MEd, Idaho State University, 1977; PhD, Texas Tech University, 1990
- McCarten, John Paul, *Assistant Professor of Physics*. BS, Wichita State University, 1986; PhD, Cornell University, 1992
- McCarthy, Lambert, *Associate Professor of Horticulture*. BS, Clemson University, 1981; MS, North Carolina State University, 1983; PhD, Clemson University, 1986
- McCaskill, Von H., *Head of Fertilizer and Pesticide Control Department; Lecturer in Entomology*. BS, Western Carolina University, 1965; MS, 1967, PhD, 1973, Clemson University
- McCleskey, Sarah, *Assistant Librarian*. AB, Randolph-Macon College, 1987; MA, 1991, MS, 1997, University of North Carolina
- McConnell, James Calvin, Jr., *Professor of Animal and Veterinary Sciences*. BS, 1965, PhD, 1970, University of Tennessee
- McCormick, Robert Exley, *Professor of Economics*. BA, 1972, MA, 1974, Clemson University; PhD, Texas A&M University, 1978
- McCracken, Margaret Mary, *Adjunct Associate Professor of Nursing*. BSN, 1965, MN, 1971, Emory University
- McCreadie, John William, *Research Associate/Assistant Professor of Entomology*. BS, University of Guelph (Canada), 1980; MS, 1984, PhD, 1991, Memorial University (Canada)
- McCubbin, James Allen, *Chair and Professor of Psychology*. BA, University of North Carolina, 1974; MA, Wake Forest University, 1976; PhD, University of North Carolina, 1980
- McCurley, Marsha Jean, *Head of Cataloging Unit; Associate Librarian*. BA, University of Georgia, 1973; MLS, George Peabody College, 1974
- McCutcheon, Gloria Sanders, *Associate Professor of Entomology, Coastal Research and Education Center*. BS, 1973, MS, 1978, Clemson University; PhD, University of Georgia, 1987
- McDonald, Gary Daniel, *Adjunct Associate Professor of Parks, Recreation, and Tourism Management*. BSF, Purdue University, 1979; MS, University of Tennessee, 1981; PhD, University of Minnesota, 1985
- McDonald, Jessyna McCree, *Associate Professor of Parks, Recreation, and Tourism Management*. BA, University of Maryland, 1971; EdM, Temple University, 1976; PhD, University of Maryland, 1981
- McElreath, Robert Brannon, Jr., *Chair and Associate Professor of Finance*. BS, Georgia Institute of Technology, 1962; MBA, 1968, PhD, 1976, Georgia State University
- McGee, Norman Addison, Jr., *Adjunct Assistant Professor of Parks, Recreation, and Tourism Management*. BS, Western Michigan University, 1977; JD, University of Georgia, 1981
- McGill, Raymond Keith, *Assistant Professor of Architecture*. BS, 1980; MArch, 1984, Clemson University
- McGregor, John David, *Associate Professor of Computer Science*. BS, 1970, MA, 1971, PhD, 1976, Vanderbilt University
- McGuire, Francis Anthony, *Professor of Parks, Recreation, and Tourism Management*. BA, Cornell University, 1973; MS, Pennsylvania State University, 1975; PhD, University of Illinois, 1979

- McInnis, Thomas McLeod, Jr., *Chair of Biological Sciences; Professor of Botany*. BS, 1966, PhD, 1971, University of North Carolina
- McKale, Donald Marshall, *Class of '41 Memorial Professor of History*. BS, Iowa State University, 1966; MA, University of Missouri, 1967; PhD, Kent State University, 1970
- McKee, William Henry, Jr., *Adjunct Associate Professor of Forest Resources*. BS, 1957, MS, 1961, Southern Illinois University; PhD, Virginia Polytechnic Institute and State University, 1965
- McKevlin, Martha Gibbons Roberson, *Adjunct Professor of Forest Resources*. BS, 1978, MS, 1984, Clemson University; PhD, University of Washington, 1994
- McKnew, Judith L., *Lecturer in Management*. BS, 1981, MS, 1986, PhD, 1994, Clemson University
- McKnew, Mark Alfred, *Professor of Management*. BS, 1971, MA, 1975, University of California; PhD, Massachusetts Institute of Technology, 1978
- McLean, Edward Lee, *Professor of Agricultural and Applied Economics; Adjunct Professor of Sociology*. BS, 1961, MS, 1964, University of Wisconsin; PhD, Iowa State University, 1968
- McLellan, Margaret Kooiman, *Associate Professor of Parks, Recreation, and Tourism Management*. BS, 1971, MA, 1972, University of South Alabama; PhD, University of Maryland, 1981
- McLellan, Robert Wesley, *Professor of Parks, Recreation, and Tourism Management*. BA, University of Saskatchewan, 1965; MS, Florida State University, 1967; PhD, University of Minnesota, 1971
- McMahan, Gary Lynn, *Adjunct Associate Professor of Agricultural and Applied Economics*. BA, Wofford College, 1968; MPA, University of South Carolina, 1981
- McMillan, Jeffrey Joseph, *Associate Professor of Accounting*. BS, 1983, MBA, 1984, Louisiana State University; PhD, University of South Carolina, 1990
- McNeice, Greg, *Biomedical Professor, GHS/SCU Biomedical Cooperative; Director of Research Administration, Greenville Hospital System*. B.A.Sc., University of Waterloo, 1964; PhD, University College, University of London, 1968
- McNulty, Peter James, *Chair and Professor of Physics and Astronomy*. BS, Fordham University, 1962; PhD, State University of New York, 1965
- Macfie, Elizabeth Finley, *Lecturer in School of Nursing*. BSN, 1964, MSN, 1964, University of North Carolina
- Mack, Pamela Etter, *Associate Professor of History*. BA, Radcliffe College, 1977; PhD, University of Pennsylvania, 1983
- Mackay, Richard Alan, *Post-Doctoral Fellow in Chemistry*. BS, University of California, 1988; PhD, Iowa State University, 1993
- Macy, Jacques Berr, *Assistant Professor of French*. BA, 1963, MAT, 1964, University of North Carolina
- Madden, Steven James, *Assistant Professor of Speech*. BA, University of South Florida, 1980; MA, New Mexico State University, 1990; PhD, University of Southern Mississippi, 1995
- Madison, Alan Wayne, *Associate Professor of Computer Science*. BS, College of William and Mary, 1969; PhD, University of Virginia, 1977
- Madray, John Russell, *Lecturer in Accounting*. BS, 1986, MPACC, 1988, Clemson University; CPA
- Maghanus, Benjamin S., Jr., *Research Associate/Assistant Professor of Environmental Engineering and Science*. BS, 1982, MS, 1987, University of the Philippines; PhD, Vanderbilt University, 1994
- Maker, William Anthony, *Chair of Philosophy and Religion; Professor of Philosophy*. BA, University of Massachusetts, 1971; MA, 1975, PhD, 1978, New School of Social Research
- Makram, Elham Badie, *Professor of Electrical and Computer Engineering*. BS, Assiut University (Egypt), 1969; MS, 1978, PhD, 1981, Iowa State University
- Malloy, Brian Alaysius*, *Associate Professor of Computer Science*. BA, LaSalle College, 1968; MEd, 1975, MS, 1983, PhD, 1990, University of Pittsburgh
- Maloney, Michael Thomas, *Professor of Economics*. BA, Lewis College, 1970; MA, Western Illinois University, 1971; PhD, Louisiana State University, 1978
- Malvern, Lori L., *Biomedical Associate Professor, GHS/SCU Biomedical Cooperative*. BA, University of Tennessee, 1983; MD, University of South Carolina School of Medicine, 1992
- Manasa, Harold John, *Lecturer in Accounting*. BA, University of West Florida, 1975; MA, University of Oklahoma, 1985; CPA, CIA, CFP
- Mangan, Kevin Gene, *Assistant Professor of Military Science*. MAJ, U.S. Army; BS, 1985, MS, 1986, Pittsburg State University
- Manley, Donald Gene, *Professor of Entomology, Pee Dee Research and Education Center*. BA, University of California, 1973; MA, California State University, 1975; PhD, University of Arizona, 1978
- Manning, William Roger, *Adjunct Professor of Ceramic and Materials Engineering*. BS, University of Utah, 1967; PhD, Iowa State University, 1971
- Manson, Janet Marilyn, *Instructor of English*. BA, 1970, MA, 1977, Portland State University; PhD, Washington State University, 1987
- Manson, Joseph Richards, *Professor of Physics*. BS, University of Richmond, 1965; PhD, University of Virginia, 1969
- Manzi, John Joseph, *Adjunct Professor of Fisheries*. BA, 1967, MS, 1969, Southern Connecticut State College; PhD, College of William and Mary, 1973
- Marcotte, William Richard, Jr., *Assistant Professor of Biological Sciences*. BS, Virginia Polytechnic Institute and State University, 1980; PhD, University of Virginia Medical School, 1987
- Marcus, Richard Kenneth, *Professor of Chemistry*. BS, Longwood College, 1982; PhD, University of Virginia, 1986
- Marion, Russell Aubrey II, *Associate Professor of Educational Leadership*. BA, 1967, MAT, 1968, MEd, 1976, PhD, 1976, University of North Carolina
- Marks, Steven Gary, *Associate Professor of History*. BA, Miami University, 1980; MA, 1981, PhD, 1988, Harvard University
- Marotta, Egidio, *Assistant Professor of Mechanical Engineering*. BS, State University of New York-Albany, 1980; MS, 1994, PhD, 1997, Texas A&M University
- Marsh, Kenneth Steven, *Cryovac Chair and Associate Professor of Packaging Science*. BA, Adelphi University, 1968; MS, 1973, PhD, 1976, Rutgers University
- Marshall, Myra Connor, *Director of Telecampus; Lecturer in Curriculum and Instruction*. BA, Columbia College, 1971; MEd, University of New Orleans, 1975; MA, University of South Carolina, 1983
- Marsinko, Allan Paul, *Associate Professor of Forest Resources*. BS, 1968, MS, 1969, Purdue University; PhD, State University of New York, 1979
- Martin, Anthony, *Associate Professor of Electrical and Computer Engineering*. BS, 1980, MS, 1983, University of Mississippi; PhD, Clemson University, 1989
- Martin, Cecile Leone Kirchner, *Lecturer in Architecture and Arts*. BS, Kutztown University, 1969; MFA, Clemson University, 1989
- Martin, Guy Thompson, *Lecturer in Accounting*. BS, 1972, MAcc, 1980, University of South Carolina
- Martin, Marie Ann, *Associate Professor of Philosophy*. BA, Brundis University, 1974; MA, Northern Illinois University, 1981; PhD, University of Massachusetts, 1987
- Martin, Marjorie Bell, *Lecturer in Chemistry*. BS, Vanderbilt University, 1967
- Martin, Samuel Bruce, *Associate Professor of Plant Pathology and Physiology*. BA, Hendrix College, 1976; MS, University of Arkansas, 1978; PhD, North Carolina State University, 1982
- Martin, Steven L., *Adjunct Professor of Bioengineering*. BS, Randolph Macon College, 1980; MD, Medical College of Virginia, 1984
- Martinez-Dawson, Rose Marie, *Lecturer in Experimental Statistics*. BS, 1984, MS, 1987, MStat, 1990, North Carolina State University
- Mason, Bryan E., *Adjunct Assistant Professor, GHS/SCU Biomedical Cooperative*. BS, Southwest Texas State University, 1986; MS, New Mexico State University, 1989
- Mason, Patrick, *Adjunct Associate Professor of Agricultural and Applied Economics*. BS, Denver University, 1973
- Massia, Stephen Paul, *Assistant Professor of Bioengineering*. BS, Southwestern University, 1981; PhD, University of Texas, 1992
- Matic, Vladimir, *Visiting Instructor of Political Science*. BA, 1962, JJD, 1964, University of Belgrade
- Matthews, John P., Jr., *Biomedical Professor, GHS/SCU Biomedical Cooperative; Academic Chairman, Department of Pediatrics, Greenville Hospital System*. BS, Furman University, 1957; MD, Medical University of South Carolina, 1960
- Maurice, Deniz Vikram, *Professor of Animal and Veterinary Sciences*. BS, Allahabad University (India), 1963; MS, University of Reading (England), 1966; PhD, University of Georgia, 1978
- May, Lloyd, *Adjunct Assistant Professor of Crop and Soil Environmental Science*. BS, University of Connecticut, 1984; MS, 1987, PhD, 1990, University of Kentucky
- May, Todd Gifford, *Professor of Philosophy*. BA, Brown University, 1978; MA, Duquesne University, 1982; PhD, Pennsylvania State University, 1989
- Maybe, Patricia R., *Visiting Assistant Professor in School of Nursing*. BSN, Capital University, 1982; MS, Ohio State University, 1987; EdD, University of Georgia, 1993; FNP, University of South Carolina, 1994
- Mayer, Eugene P., *Adjunct Professor, GHS/SCU Biomedical Cooperative*. BS, 1967, PhD, 1974, Marquette University
- Mayo, Rachel M., *Assistant Professor of Health Science*. BS, 1991, MA, 1993, University of Arkansas; PhD, University of South Carolina, 1997
- Mazur, Anthony Robert, *Professor of Crop and Soil Environmental Science*. BS, 1963, MS, 1968, University of Rhode Island; PhD, University of Illinois, 1973
- Meehan, Nancy Karen, *Associate Professor in School of Nursing*. BSN, Medical University of South Carolina, 1978; MSN, 1981, PhD, 1985, University of Texas
- Meenaghan, George Francis, *Adjunct Professor of Chemical Engineering*. BS, 1952, MS, 1954, PhD, 1956, Virginia Polytechnic Institute and State University
- Mega, Carolyn Blanche, *Lecturer in School of Nursing*. BSN, Barry University, 1983; MS, Clemson University, 1992
- Melloy, Brian James, *Associate Professor of Industrial Engineering*. BSE, 1978, MSIE, 1981, PhD, 1986, University of South Florida
- Melsheimer, Stephen Samuel, *Associate Dean, College of Engineering and Science; Professor of Chemical Engineering*. BS, Louisiana State University, 1965; PhD, Tulane University, 1969
- Melton, Judith Mary, *Professor of German*. BA, 1963, MA, 1966, PhD, 1972, Louisiana State University
- Mente, Peter Lawrence, *Visiting Assistant Professor of Bioengineering*. BA, University of Chicago, 1983; MS, 1987, PhD, 1994 Northwestern University

- Mercer, Lisa Michelle**, *Visiting Assistant Professor of Theatre*. BA, University of Idaho, 1992; MFA, University of Nebraska, 1996
- Meriwether, John Williams, Jr.**, *Professor of Physics and Astronomy*. BS, Massachusetts Institute of Technology, 1964; PhD, University of Maryland, 1970
- Meyer, Bradley Stewart**, *Associate Professor of Physics*. BA, Rice University, 1983; PhD, University of Chicago, 1989
- Mihalik, Brian Johnathan**, *Adjunct Associate Professor of Parks, Recreation, and Tourism Management*. BS, 1970, MS, 1972, 1974, Syracuse University; EdD, Temple University, 1981
- Mihelich, John L.**, *Adjunct Professor of Ceramic and Materials Engineering*. BS, 1959, MS, 1961, PhD, 1964, Case Western Reserve University
- Millar, Donna J.**, *Biomedical Associate Professor, GHS/UCU Biomedical Cooperative*. BS, 1976, MD, 1980, University of Alabama
- Miller, Arsel Eldon**, *Assistant Professor of Forest Resources*. BS, Mississippi State University, 1964; MS, Clemson University, 1969; PhD, University of Georgia, 1973
- Miller, Fred Anthony**, *Lecturer in Computer Science*. BS, Francis Marion University, 1994; MS, Clemson University, 1996
- Miller, Holly Adair**, *Instructor of English*. BA, Mercer University, 1995; MA, Clemson University, 1998
- Miller, James Andrew**, *Associate Professor of Geography*. BA, State University of New York, 1969; MA, 1972, PhD, 1981, University of Texas
- Miller, Janis**, *Associate Professor of Management*. BS, 1978, MBA, 1986, PhD, 1990, University of Missouri
- Miller, Marie D.**, *Lecturer in Special Education*. BS, 1978, MA, 1982, Ball State University
- Miller, Marilyn Patterson**, *Associate Professor of Nursing*. BSN, 1977, MSH, 1979, University of North Florida; MSN, University of Florida, 1986; PhD, University of Miami, 1993
- Miller, Richard S.**, *Biomedical Associate Professor, GHS/UCU Biomedical Cooperative; Associate Director of Trauma Surgery, Greenville Hospital System*. BA, University of South Florida, 1980; MD, Universidad Centro de Estudios Tecnicos (Dominican Republic), 1983
- Miller, Robert James**, *Lecturer in Architecture*. BA, 1976, MArch, 1979, Clemson University
- Miller, Robert Walker, Jr.**, *Professor of Plant Pathology and Physiology*. BS, University of Delaware, 1964; MS, University of Arizona, 1970; PhD, University of Delaware, 1971
- Miller, Sharon B.**, *Adjunct Associate Professor of Biology*. BA, Winthrop College, 1967; MS, Clemson University, 1969; PhD, University of Georgia, 1974
- Miller, Stephen Ernest**, *Professor of Agricultural and Applied Economics*. BS, North Carolina State University, 1972; PhD, Virginia Polytechnic Institute and State University, 1977
- Miller, Teresa Marie**, *Instructor of English*. BA, 1994, MA, 1997, Clemson University
- Mills, Gary Lawrence**, *Adjunct Associate Professor of Environmental Engineering and Science*. BS, Southern Connecticut State College, 1975; PhD, University of Rhode Island, 1981
- Milo, Audrey Rosser**, *Assistant Professor of Counseling*. BA, Fort Valley State College, 1962; MEd, Louisiana State University, 1979
- Minor, Verna Christine Mahaffey**, *Lecturer in Biology*. BS, University of South Carolina, 1991; MS, Iowa State University, 1997
- Mittelstaedt, John D.**, *Assistant Professor of Marketing*. BS, Saint Olaf College, 1986; MTS, Harvard University, 1989; PhD, University of Iowa, 1995
- Mitchell, Paula Levin**, *Adjunct Assistant Professor of Entomology*. BA, University of Pennsylvania, 1973; PhD, University of Texas-Austin, 1980
- Mobley, Catherine**, *Assistant Professor of Sociology*. BA, Clemson University, 1984; MS, University of Bath (England), 1990; PhD, University of Maryland, 1996
- Moise, Edwin Evariste**, *Professor of History*. BA, Harvard University, 1967; MA, 1972, PhD, 1977, University of Michigan
- Moltz, Fred John**, *Distinguished Scientist of Environmental Engineering and Science, Professor of Geological Sciences*. BS, 1966, MS, 1968, Drexel University; PhD, Stanford University, 1970
- Monghate, Marcia**, *Lecturer in School of Nursing*. BSN, 1968, MSN, 1972, University of Cincinnati
- Montanucci, Richard Roman**, *Associate Professor of Zoology*. BS, University of California, 1967; MA, 1969, PhD, 1972, University of Kansas
- Moody, Shirley Ann**, *Adjunct Instructor in School of Nursing*. BSN, 1976, MPH, 1977, University of South Carolina
- Moore, Aubrey**, *Adjunct Professor of Plant Pathology and Physiology*. BS, Carleton University (Canada), 1979; MS, Michigan State University, 1984; PhD, University of Hawaii, 1988
- Moore, Donville DeWayne**, *Professor of Psychology*. BA, North Texas State University, 1974; MA, 1977, PhD, 1979, Michigan State University
- Moore, Ernest, Jr.**, *Assistant Professor of Military Science*. CPT, U.S. Army; BS, Benedict College, 1987
- Moore, Jesse N.**, *Assistant Professor of Marketing*. BA, University of Richmond, 1981; MBA, Northern Arizona University, 1992; PhD, University of South Florida, 1997
- Moran, Ronald Wesson**, *Associate Dean, College of Architecture, Arts, and Humanities; Professor of English*. BA, Colby College, 1958; MA, 1962, PhD, 1966, Louisiana State University
- Morris, Earl Elias, Jr.**, *Adjunct Professor of Political Science*. BS, Clemson University, 1949
- Morris, Keith Lee**, *Instructor of English*. BA, University of Idaho, 1992; MA, 1994, MFA, 1996, University of North Carolina
- Morris, Michael Alan**, *Professor of Political Science and Languages*. BA, Southern Illinois University, 1962; MA, Middlebury College, 1963; MA, 1965, PhD, 1971, Johns Hopkins University
- Morrissey, Lee Joseph**, *Assistant Professor of English*. BA, Boston College, 1986; MA, 1988, MA, 1990, MPhil, 1992, PhD, 1995, Columbia University
- Morse, John Chapman**, *Professor of Entomology*. BS, Davidson College, 1968; MS, Clemson University, 1970; PhD, University of Georgia, 1974
- Moss, William Fred III**, *Professor of Mathematical Sciences*. BS, Massachusetts Institute of Technology, 1966; PhD, University of Delaware, 1974
- Mounter, Clyde Thompson**, *Professor of Family and Youth Development*. BA, Central Methodist College, 1958; MS, University of Missouri, 1973; PhD, University of Georgia, 1985
- Moyle, David Douglas**, *Lecturer in Physics and Astronomy*. BS, Wilkes College, 1964; PhD, Rensselaer Polytechnic Institute, 1969
- Mueller, John David**, *Professor of Plant Pathology and Physiology, Editor Research and Education Center*. BS, University of Missouri, 1978; MS, 1981, PhD, 1983, University of Illinois
- Mullaney, Mary Ann**, *Lecturer in School of Nursing*. BS, Newton College of the Sacred Heart, 1967; BS, State University of New York, 1985; MS, Clemson University, 1993
- Mumford, John Martin**, *Associate Professor of Construction Science and Management*. BS, Auburn University, 1979; MEd, Clemson University, 1984
- Munson, Priscilla Ceier**, *Associate Librarian*. BA, Indiana University, 1972; MLS, University of South Carolina, 1988
- Murden, John Alden**, *Adjunct Assistant Professor of Civil Engineering*. BS, 1977, MS, 1984, PhD, 1987, Clemson University
- Murdoch, Lawrence Charles**, *Assistant Professor of Geological Sciences and Environmental Engineering and Science*. BS, Pennsylvania State University, 1980; MS, 1983, 1987, PhD, 1991, University of Cincinnati
- Murdoch, Edward Charles**, *Professor of Crop and Soil Environmental Science*. BS, 1971, MS, 1978, Clemson University; PhD, University of Georgia, 1985
- Murr, Kenneth Ray**, *Librarian*. BA, Maryville College, 1972; MS, 1974, MSLS, 1975, University of Tennessee
- Murrow, Elizabeth Jean**, *Professor in School of Nursing*. BS, College of St. Mary, 1962; MSN, 1976, PhD, 1981, University of Nebraska
- Musso, Robert John**, *Lecturer in Engineering*. BS, Akron University, 1975
- Naff, Beatrice Ethel**, *Professor of Curriculum and Instruction*. BA, Longwood College, 1978; MA, Bethany Theological Seminary, 1981; EdD, Virginia Polytechnic Institute and State University, 1987
- Nagele, Emil John**, *Visiting Lecturer in Management*. BA, Syracuse University, 1949; MBA, University of Chicago, 1953
- Nave, Stanley Eugene**, *Adjunct Professor of Chemistry*. BS, East Tennessee State University, 1972; MS, 1976, PhD, 1979, University of Tennessee
- Nelson, Charles Riley**, *Adjunct Assistant Professor of Entomology*. BS, 1980, MS, 1984, Utah State University; PhD, Brigham Young University, 1986
- Nelson, Eric Alan**, *Adjunct Professor of Forest Resources*. BA, Occidental College, 1971; MS, 1974, PhD, 1978, Oregon State University
- Nelson, James Karl, Jr.**, *Program Director, Master of Engineering Program at The Citadel; Professor of Civil Engineering*. BCE, University of Dayton, 1974; MS, 1976, PhD, 1983, University of Houston; PE
- Nelson, Larry Robert**, *Associate Professor of Forest Resources*. BS, Ohio University, 1972; MF, Duke University, 1974; PhD, Auburn University, 1987
- Nelson, Peter Reid**, *Professor of Mathematical Sciences*. BS, Case Institute of Technology, 1971; MS, 1973, PhD, 1975, Case Western Reserve University
- Nettles, William Carl, Jr.**, *Adjunct Professor of Entomology*. BS, 1955, MS, 1959, Clemson University; PhD, Rutgers University, 1962
- Newkirk, Gary L.**, *Lecturer in Management*. BS, U.S. Naval Academy, 1966; MBA, University of Virginia, 1976; EdD, Clemson University, 1992
- Newman, Meredith E.**, *Adjunct Assistant Professor of Environmental Engineering and Science*. BS, Southern College, 1981; MS, 1985, PhD, 1989, Clemson University
- Nicholas, David Mansfield**, *Professor of History*. BA, University of North Carolina, 1961; MA, University of California, 1963; PhD, Brown University, 1967
- Nichols, John Edwin**, *Adjunct Assistant Professor of Molecular Medicine*. BS, Columbus University, 1981; MD, Medical College of Georgia, 1988
- Nichols, Mary Schumpert**, *Instructor of English*. BA, Converse College, 1977; MAT, The Citadel, 1994
- Nix, Lawrence Edward**, *Associate Professor of Forest Resources*. BS, 1968, MS, 1970, Mississippi State University; PhD, University of Georgia, 1974
- Noblet, Gayle Pittman**, *Professor of Zoology*. BS, Oklahoma Panhandle State College, 1968; PhD, Rice University, 1972
- Noblet, Raymond**, *Adjunct Professor of Entomology*. BS, 1965, MS, 1967, PhD, 1970, University of Georgia
- Nocks, Barry Coleman**, *Coordinator of City and Regional Planning Program; Professor of Planning*. BS, Cornell University, 1969; MRP, 1972, PhD, 1978, University of North Carolina

- Nodine, Stephen K., *Adjunct Assistant Professor of Forest Resources*. BS, 1976, MS, 1978, PhD, 1990, Clemson University
- Noe, Francis Paul, *Adjunct Associate Professor of Parks, Recreation, and Tourism Management*. BS, Canisius College, 1962; MA, Michigan State University, 1967; PhD, State University of New York, 1972
- Noneaker, Daniel Lee, *Assistant Professor of Electrical and Computer Engineering*. BS, Auburn University, 1977; MS, Emory University, 1979; MS, Georgia Institute of Technology, 1984; PhD, University of Illinois, 1993
- Norman, Richard Bullis, *Professor of Architecture*. BS, Lawrence University, 1955; BA, University of Illinois, 1959; MArch, University of Michigan, 1961; AIA
- Norman, William Clayton, *Assistant Professor of Parks, Recreation, and Tourism Management*. BS, University of Minnesota, 1980; MS, Michigan State University, 1987; PhD, University of Minnesota, 1995
- Nortcliff, Stephen, *Adjunct Professor of Crop and Soil Environmental Science*. BA, University of Bristol, 1969; PhD, University of East Anglia, 1974
- Novick, Beth Ann, *Assistant Professor of Mathematical Sciences*. BS, Barnard College, 1972; MS, University of Colorado, 1984; PhD, Carnegie-Mellon University, 1990
- Nowack, Robert Francis, *Alumni Distinguished Professor of Civil Engineering*. BS, Carnegie-Mellon University, 1948; MS, University of Pittsburgh, 1952
- Nyankori, James Cyprian Okuk, *Professor of Agricultural and Applied Economics*. BS, Makerere University (Uganda), 1968; MS, Ohio State University, 1970; PhD, University of Illinois, 1977
- Nycepier, Andrew Peter, *Adjunct Associate Professor of Plant Pathology and Physiology*. BSA, University of Georgia, 1974; MS, 1976, PhD, 1980, Clemson University
- Oakland, Billie Gwin Murphy, *Adjunct Professor of Horticulture*. BA, Blue Mountain College, 1951; MSHE, University of Alabama, 1952; PhD, Pennsylvania State University, 1972
- Oberdan, Thomas Joseph, *Associate Professor of Philosophy*. BA, University of Missouri, 1972; MA, 1975, MA, 1976, PhD, 1989, Indiana University
- Ochterbeck, Jay Matthew, *Assistant Professor of Mechanical Engineering*. BS, 1987, MS, 1990, PhD, 1993, Texas A&M University
- Ogale, Amod Arvind, *Professor of Chemical Engineering*. BS, Indian Institute of Technology, 1982; PhD, University of Delaware, 1986
- Oglesby, Frances Madelynna, *Associate Professor in School of Nursing*. BSNE, Florida State University, 1962; MS, University of Maryland, 1963; PhD, University of Delaware, 1971
- Oldaker, Syble Maynard, *Professor in School of Nursing*. BS, Valdosta State College, 1974; MS, Medical College of Georgia, 1977; PhD, Texas Woman's University, 1984
- Olson, Larry Wayne, *Associate Professor of Animal Science, Editor Research and Education Center*. BS, Oklahoma State University, 1971; MS, 1974, PhD, 1976, University of Nebraska
- Olson, Laura Ruth, *Assistant Professor of Political Science*. BA, Northwestern University, 1990; MA, 1991, PhD, 1996, University of Wisconsin-Madison
- O'Rourke, Mark A., *Biomedical Professor, GHS/CU Biomedical Cooperative; Director of Medical Research, Cancer Treatment Center, Greenville Hospital System*. BS, Stanford University, 1974; MD, University of California-Los Angeles, 1982
- Osborne, Kristen Kathleen, *Lecturer in Graphic Communications*. BA, 1994, MEd, 1996, Clemson University
- Otis, David Lee, *Leader of South Carolina Cooperative Fish and Wildlife Research Unit; Professor of Wildlife*. BS, 1971, MS, 1974, PhD, 1976, Colorado State University
- Otto, Amy Lea, *Visiting Instructor of Psychology*. BA, University of Northern Iowa, 1987; MS, University of Wisconsin-Madison, 1989
- Otto, Jessica Ann, *Instructor of English*. BS, Shepherd College, 1995; MA, Clemson University, 1998
- Overcamp, Thomas Joseph, *Professor of Environmental Engineering and Science*. BS, Michigan State University, 1968; MS, 1970, PhD, 1973, Massachusetts Institute of Technology; PE
- Owen, Warren Herbert, *Adjunct Professor of Engineering*. BME, Clemson University, 1947
- Owens, Emma McIntosh, *Associate Professor of Curriculum and Instruction*. BS, Morris College, 1963; MS, George Washington University, 1972; EdD, Clemson University, 1986
- Owens, Rameth Richard, *Assistant Professor of History*. BA, Agnes Scott College, 1956; MA, 1961, PhD, 1989, Florida State University
- Pace, Thomas Brantley, *Adjunct Assistant Professor of Bioengineering*. BS, Mississippi State University, 1978; MD, University of Mississippi School of Medicine, 1982
- Pagano, Christopher Carr, *Assistant Professor of Psychology*. BA, 1987, PhD, 1993, University of Connecticut
- Page, Edward Walker III, *Professor of Computer Science*. BS, Clemson University, 1965; MS, University of Alabama, 1968; PhD, Duke University, 1973
- Paige, William Dennison, *Professor of Technology and Human Resource Development*. BS, 1968, MS, 1972, State University of New York-Oswego; PhD, Ohio State University, 1978
- Palmer, Ammon Henry, *Assistant Professor of Aerospace Studies*. CAPT, U.S. Air Force; BS, Clemson University, 1991; MBS, West Coast University, 1996
- Palmer, James Howell, *Professor of Crop and Soil Environmental Science*. BS, Clemson University, 1964; MS, University of Georgia, 1966; PhD, Clemson University, 1969
- Palmer, Richard Barton, *Chair of English; Calhoun Lemon Professor of Literature*. BA, Dartmouth College, 1968; BA, University of Durham, 1970; MPhil, 1972, PhD, 1974, Yale University; MA, 1984, PhD, 1989, New York University
- Pargas, Roy Peredo, *Associate Professor of Computer Science*. BS, Ateneo de Manila University (Philippines), 1971; MS, 1981, PhD, 1982, University of North Carolina
- Park, Hyun Jin, *Adjunct Associate Professor of Packaging Science*. BS, 1983, MS, 1985, Korea University; PhD, University of Georgia, 1991
- Park, Lauretta Irene, *Associate Professor of Psychology*. BA, Muskingum College, 1969; MS, 1971, PhD, 1972, Florida State University
- Park, William John, Jr., *Associate Professor of General Engineering*. BS, 1978, MS, 1981, PhD, 1986, Clemson University
- Parker, Charles Rex, *Adjunct Associate Professor of Entomology*. BS, 1973, MS, 1976, George Mason University; PhD, Virginia Polytechnic Institute and State University, 1980
- Parker, Veronica Gail, *Assistant Professor in School of Nursing*. BS, College of Charleston, 1984; BS, Clemson University, 1986; PhD, Medical University of South Carolina, 1994
- Parks, Thomas Ilon, *Associate Dean, College of Health, Education, and Human Development; Director of Off Campus Academic Studies; Professor of Higher Education*. BA, 1960, MA, 1963, Northeast Louisiana University; EdS, 1971, PhD, 1976, Peabody College
- Parrilla, Osvaldo, *Instructor of Spanish*. BA, University of the Virgin Islands, 1985; MA, New York University, 1987
- Parzinger, Monica J., *Assistant Professor of Management*. BS, Bowling Green State University, 1975; MBA, University of Kentucky, 1987; PhD, University of Memphis, 1996
- Pate, Christopher Scott, *Visiting Instructor of Mathematical Sciences*. BS, 1992, MS, 1994, Clemson University
- Patel, Sharmila J., *Instructor of English*. BA, Mercer University, 1993; MA, Clemson University, 1996
- Patterson, Gordon Whitfield, *Associate Professor of Architecture*. BS, BArch, University of Arkansas, 1965; MArch, Clemson University, 1974
- Patterson, James Wayne, *Associate Professor of Management*. BS, 1970, MA, 1971, University of Alabama; PhD, University of Arkansas, 1977
- Patterson, William McClinton, *Assistant Professor of Sociology*. BA, 1973, MS, 1974, Ohio State University; PhD, Cornell University, 1984
- Paul, Catherine Elizabeth, *Assistant Professor of English*. BA, University of North Carolina, 1993; MA, 1995, PhD, 1998, University of Michigan
- Paul, Frank Waters, *McQueen Quattlebaum Professor of Mechanical Engineering*. BS, 1960, MS, 1964, Pennsylvania State University; PhD, Lehigh University, 1968; PE
- Payne, James Edward, *Adjunct Professor of Physics and Astronomy*. BS, Hampden-Sydney College, 1966; MS, 1969, PhD, 1971, Clemson University
- Paynter, Malcolm James Benjamin, *Professor of Microbiology*. BSc, 1959, MSc, 1962, PhD, 1964, Sheffield University (England)
- Paynter, Valerie, *Adjunct Professor of Plant Pathology and Physiology*. BS, University of London, 1957; PhD, Clemson University, 1975
- Pearce, Frederick James, *Adjunct Assistant Professor of Bioengineering*. BS, St. Lawrence University, 1972; MS, 1976, PhD, 1977, University of Rochester
- Pearson, Lonnie Wilson, *Professor of Electrical and Computer Engineering*. BSEE, 1968, MS, 1973, University of Mississippi; PhD, University of Illinois, 1976
- Peck, John Charles, *Professor of Computer Science*. BS, 1966, MS, 1968, PhD, 1971, University of Southwestern Louisiana
- Peeler, David Kirk, *Adjunct Assistant Professor of Ceramic and Materials Engineering*. BS, Clemson University, 1987; MS, Alfred University, 1989; PhD, Clemson University, 1993
- Peirce, Susan Kitchell, *Adjunct Lecturer in Environmental Engineering and Science*. BS, University of Wisconsin-Green Bay, 1978; MS, University of Cincinnati, 1985; MS, Cornell University, 1992
- Pellerin, Carolyn Freeman, *Lecturer in Computer Science*. BS, North Georgia College, 1968; MS, Clemson University, 1970
- Pellerin, Henry Arthur, *Lecturer in Computer Science*. BS, University of Southwestern Louisiana, 1965; PhD, Clemson University, 1972
- Pennington, William Thomas, *Associate Professor of Chemistry*. BA, Hendrix College, 1977; PhD, University of Arkansas, 1983
- Peppers, Larry Gene, *Associate Professor of Sociology*. BS, 1969, MA, 1971, Memphis State University; PhD, Oklahoma State University, 1973
- Perahia, Dvora, *Assistant Professor of Chemistry*. PhD, Feinberg Graduate School, Weizmann Institute of Science (Israel), 1990
- Peralta, Perry Nacnac, *Assistant Professor of Forest Resources*. BS, 1980, MS, 1985, University of the Philippines; PhD, Virginia Polytechnic Institute and State University, 1990
- Perdue, Richard Russell, *Adjunct Instructor in Food Science and Packaging Science*. BS, University of Georgia, 1954

- Perlow, Richard**, Associate Professor of Psychology. BA, University of Miami, 1976; MS, Indiana University, 1978; MA, 1986, PhD, 1990, University of Houston
- Perry, Dale Charles**, Adjunct Professor of Civil Engineering. BS, University of Utah, 1953; MS, 1956, PhD, 1968, University of California-Berkeley
- Pertuit, Alton Joseph, Jr.**, Associate Professor of Horticulture. BS, 1962, MS, 1964, Louisiana State University; PhD, University of Maryland, 1970
- Peters, Chris Leigh**, Associate Professor of Educational Foundations. BA, 1978, MEd, 1983, Clemson University; EdD, University of Georgia, 1988
- Peters, Thomas Terrence**, Research Associate in Engineering. Director of Anderson, Oconee, Pichens HUB. BS, 1982, ME, 1985, EdD, 1990, University of Illinois-Urbana-Champaign
- Peterson, James Kent**, Associate Professor of Mathematical Sciences. BA, Indiana University, 1975; MS, 1977, PhD, 1980, Colorado State University
- Picciolo, Grace Lee**, Adjunct Professor of Bioengineering. BA, Trinity College, 1956; PhD, University of Maryland, 1964
- Pickett, Gregory Mark**, Associate Professor of Marketing. BS, 1979, MBA, 1983, PhD, 1985, Oklahoma State University
- Pinkerton, Bruce Willis**, Associate Professor of Crop and Soil Environmental Science. BA, Southwest Texas State University, 1971; MS, 1976, PhD, 1982, Texas A&M University
- Piper, Christine Ann**, Assistant Professor of Construction Science and Management. BArch, 1986, MBSM, 1988, Clemson University
- Piper, Wendy Ann**, Instructor of English. BA, 1984, MA, 1990, Florida Atlantic University
- Pivorun, Edward Broni**, Professor of Zoology. BS, Tufts University, 1968; PhD, University of Minnesota, 1973
- Placone, Dennis Lawrence**, Associate Professor of Economics; Director, Center for Economic Education. BA, 1970, MA, 1972, PhD, 1982, University of Pittsburgh
- Poole, Kelvin Fraser**, Professor of Electrical and Computer Engineering. BS, 1964, MS, 1966, University of Natal; PhD, University of Manchester (England), 1969
- Pope, James Russell, Jr.**, Director of Campus Recreation; Professor of Parks, Recreation, and Tourism Management. BS, Georgia Southern College, 1973; MRPA, Clemson University, 1975; EdD, University of South Carolina, 1980
- Porcher, Cordes Francis, Jr.**, Lecturer in Graphic Communications. BS, 1988, MEd, 1992, Clemson University
- Porter, Nancy Miller**, Associate Professor of Family and Youth Development. BS, 1974, MS, 1985, Mansfield State College; PhD, Virginia Polytechnic Institute and State University, 1990
- Porter, Paul Max**, Assistant Professor of Crop and Soil Environmental Science. BS, Moorhead State University, 1978; MS, 1983, PhD, 1986, University of Illinois
- Poser, Nicola**, Visiting Instructor of Political Science. BA, Agnes Scott College, 1990; MA, University of Massachusetts, 1996
- Potts, David W.**, Biomedical Professor, GHS/UC Biomedical Cooperative; Academic Chairman of Internal Medicine, Greenville Hospital System. BS, Hobart College, 1967; MD, State University of New York, 1971
- Potts, Thomas Delette**, Associate Professor of Parks, Recreation, and Tourism Management. BS, Florida State University, 1975; MS, University of Southern Mississippi, 1979; PhD, Texas A&M University, 1985
- Pouder, Richard William**, Assistant Professor of Management. BS, 1974, MS, 1977, State University of New York; PhD, University of Connecticut, 1993
- Powell, Gary Lee**, Professor of Biochemistry. BS, University of California, 1962; PhD, Purdue University, 1967
- Powers, Dennis Lee**, Adjunct Associate Professor of Bioengineering. BS, 1975, DVM, 1977, University of Minnesota
- Prater, Mary Ann Mason**, Lecturer in Accounting. BS, 1978, MS, 1983, Clemson University; CPA
- Prevost, Shari Anne**, Lecturer in Mathematical Sciences. BS, University of Florida, 1982; PhD, Rutgers University, 1989
- Price, Thomas M.**, Associate Professor of Molecular Medicine; Biomedical Associate Professor, GHS/UC Biomedical Cooperative; Associate Professor of Reproductive Endocrinology, Greenville Hospital System. MD, University of North Carolina, 1984
- Price, Vaneaton, Jr.**, Adjunct Associate Professor of Geological Sciences. BS, University of South Carolina, 1962; MS, 1967, PhD, 1969, University of North Carolina
- Priewe, John Matthew**, Assistant Librarian. BA, University of California-Berkeley, 1982; MLIS, San Jose State University, 1996
- Privette, Arlene Bauknight**, Assistant Dean, College of Health, Education, and Human Development; Associate Professor in School of Nursing. BSN, University of South Carolina, 1969; MS, Clemson University, 1978; PhD, University of South Carolina, 1990
- Privette, Ricardo DeWayne**, Assistant Professor of Aerospace Studies. MAJ, U.S. Air Force; BS, Southern Illinois University, 1984; MS, Georgia College, 1990
- Proctor, Thomas Gilmer**, Professor of Mathematical Sciences. BNE, 1956, MS, 1962, PhD, 1964, North Carolina State University
- Provost, Patricia Ann**, Instructor of English. BA, 1973, MA, 1991, University of Georgia
- Pruit, Rosanne Harkey**, Associate Professor in School of Nursing. BSN, Emory University, 1974; MN, University of South Carolina, 1979; PhD, University of Maryland, 1989
- Prziembel, Christian Ernst-Georg**, Associate Dean, College of Engineering and Science; Professor of Mechanical Engineering. BS, 1963, MS, 1964, PhD, 1967, Rutgers University
- Pursley, Michael Bader**, Holcombe Professor of Electrical and Computer Engineering. BS, 1967, MS, 1968, Purdue University; PhD, University of Southern California, 1974
- Pury, Cynthia Lynn Sandstrom**, Assistant Professor of Psychology. BA, University of Wisconsin, 1989; MS, 1991, PhD, 1997, Northwestern University
- Quisenberry, Virgil Lee**, Professor of Crop and Soil Environmental Science. BS, 1969, MS, 1970, PhD, 1974, University of Kentucky
- Rack, Henry Johan**, Professor of Materials Science and Engineering. BS, 1964, MS, 1965, ScD, 1968, Massachusetts Institute of Technology
- Radhakrishna, Rama B.**, Assistant Professor of Agricultural Education. BS, 1980, MS, 1984, University of Agricultural Sciences (India); PhD, Pennsylvania State University, 1990
- Rahn, Christopher David**, Associate Professor of Mechanical Engineering. BS, University of Michigan, 1985; MS, 1986, PhD, 1992, University of California
- Rainey, Cheryl T.**, Associate Professor of Health Science. BSE, 1977, MA, 1981, Northeast Missouri State University; PhD, University of South Carolina, 1991
- Rainey, Daniel Vincent**, Assistant Professor of Agricultural and Applied Economics. BS, University of Arkansas, 1990; MS, 1992, PhD, 1997, Purdue University
- Rajapakse, Nihal Chandrakumar**, Research Associate/Associate Professor of Horticulture. BS, University of Peradeniya (Sri Lanka), 1980; MS, Texas A&M University, 1986
- Ramaya, Deepthi**, Lecturer in Computer Science. BS, University of Florida, 1982; MS, University of Wisconsin, 1983
- Ramirez, Barbara Jeanne**, Lecturer in English. BA, 1979, MA, 1982, Clemson University
- Ramp, Warren Keith**, Adjunct Assistant Professor of Bioengineering; Adjunct Professor, GHS/UC Biomedical Cooperative. BS, State University of New York-Oswego, 1963; MS, Colorado State University, 1964; PhD, University of Kentucky, 1967
- Ramsay, Louis Patrick**, Associate Professor of Accounting. BS, University of California, 1965; MS, San Jose State College, 1969; DBA, Kent State University, 1975; CPA
- Ramsey, Bruce Wayne**, Visiting Instructor of Chemistry. BS, Clemson University, 1998
- Ransom, Bruce William**, Associate Professor of Political Science. BA, Hampton Institute, 1971; MA, 1974, PhD, 1981, University of Virginia
- Rash, Daniel Ray**, Director of Chorus; Associate Professor of Music. BM, University of Texas, 1973; MMEd, University of North Texas, 1976; DMA, University of Colorado, 1989
- Rathwell, Paul James**, Professor of Agricultural and Applied Economics. BS, Arizona State University, 1969; MS, 1972, PhD, 1975, Oklahoma State University
- Ray, John Robert**, Professor of Physics and Astronomy. BS, Rose-Hulman Institute of Technology, 1961; PhD, Ohio University, 1964
- Raymark, Patrick Henry**, Assistant Professor of Psychology. BS, University of Wisconsin, 1987; MS, Illinois State University, 1989; PhD, Bowling Green State University, 1993
- Rayner, Douglas Alan**, Adjunct Associate Professor of Botany. BA, University of New Hampshire, 1971; MS, 1974, PhD, 1976, University of South Carolina
- Reardon, Linda Brown**, Coordinator of Educational Media; Associate Professor of Educational Foundations. BA, Winthrop College, 1969; MA, University of Georgia, 1974; MA, Western Carolina University, 1975; EdD, Virginia Polytechnic Institute and State University, 1987
- Rebert, Carolyn Rose**, Director, Bob Campbell Geology Museum; Lecturer in Geological Sciences. BS, 1983, MS, 1986, PhD, 1995, University of Oregon
- Redmann, Linda Louise**, Professor of Family and Youth Development. BS, University of North Dakota, 1967; MS, 1976, PhD, 1980, University of Arizona
- Reed, Erik Karlson**, Research Associate in Electrical and Computer Engineering. BS, Bob Jones University, 1976; BS, 1985, MS, 1988, PhD, 1990, Clemson University
- Reel, Jerome Vincent, Jr.**, Senior Vice Provost and Dean of Undergraduate Studies; Professor of History. BS, 1960, MA, 1961, University of Southern Mississippi; PhD, Emory University, 1967
- Reese, Glen Patrick**, Adjunct Professor of Chemical Engineering. BS, Montana State University, 1963; MS, Kansas State University, 1970
- Reese, Richard Martin**, Chair and Professor of Marketing. BBA, 1968, MBA, 1969, PhD, 1972, University of Texas
- Regan, Susan B.**, Lecturer in School of Nursing. BS, Clemson University, 1986; MN, University of South Carolina, 1991
- Reichenbach, Mary Ann Beaton**, Associate Professor in School of Nursing. BS, Simmons College, 1960; MS, West Virginia University, 1976; MSN, 1981, PhD, 1985, University of Pittsburgh
- Reid, James Louis**, Lecturer in Physics and Astronomy. BS, Clemson University, 1957; MS, Georgia Institute of Technology, 1960; PhD, Clemson University, 1974
- Reighard, Gregory Lynn**, Associate Professor of Horticulture. BS, Pennsylvania State University, 1977; MS, University of Michigan, 1978; PhD, Michigan State University, 1984
- Reimer, Mary Steffan**, Director of Media Resource Center; Lecturer in School of Nursing. BA, Bowling Green State University, 1969; MLS, Kent State University, 1980

- Reinhold, Timothy Allen, *Associate Professor of Civil Engineering*. BS, 1973, MS, 1975, PhD, 1977, Virginia Polytechnic Institute and State University; PE
- Reneke, James Allen, *Professor of Mathematical Sciences*. BA, 1958, MA, 1960, University of Florida; PhD, University of North Carolina, 1964
- Revis-Wagner, Charles Kenyon, *Associate Professor of Biology*. BA, Emory University, 1965; MS, 1968, PhD, 1973, University of Georgia
- Rhodehamel, E. Jeffrey, *Adjunct Assistant Professor of Food Science*. BS, 1979, MS, 1983, PhD, 1996, Virginia Polytechnic Institute and State University
- Rhodes, Billy Beryl, *Professor of Horticulture*. BA, Arkansas College, 1964; MS, University of Arkansas, 1966; PhD, Kansas State University, 1973
- Rice, Elizabeth Coykendall, *Instructor of English*. BA, 1982, MEd, 1988, Clemson University
- Rice, James Shelby, *Professor of Crop and Soil Environmental Science*. BS, 1966, MS, 1968, University of Tennessee; PhD, University of Illinois, 1971
- Rice, Matthew Hamilton, *Associate Professor of Architecture*. BS, 1980, MArch, 1987, Clemson University
- Rice, Richard Wayne, *Associate Professor of Chemical Engineering*. BS, Clemson University, 1968; MPH, 1970, MS, PhD, 1972, Yale University
- Richardson, Mary Elaine, *Associate Professor of Animal and Veterinary Sciences*. BS, Memphis State University, 1970; MS, 1976, PhD, 1986, Clemson University
- Riddle, Charles Dayton, Jr., *Adjunct Professor of Bioengineering; Biomedical Professor, GHS/UC Biomedical Cooperative; Director of Orthopaedic Education, Greenville Hospital System*. BS, Furman University, 1953; MD, Medical University of South Carolina, 1957
- Ridgeway, Victoria Gentry, *Assistant Professor of Curriculum and Instruction*. BS, North Georgia College, 1968; MAT, Emory University, 1969; PhD, University of Georgia, 1994
- Rieck, James Russell, *Associate Professor of Experimental Statistics*. BS, Salisbury State College, 1974; MS, 1978, PhD, 1989, Clemson University
- Riedel, Lisa Mims, *Visiting Instructor of Chemistry*. BA, College of Charleston, 1994
- Riester, John Bryan, *Lecturer in Mechanical Engineering and Project Manager of the South Carolina Energy Research and Development Center*. BS, 1976, MS, 1977, PhD, 1983, West Virginia University
- Riley, Helene Maria, *Alumni Distinguished Professor of German*. BA, North Texas State University, 1970; MA, 1973, PhD, 1975, Rice University
- Riley, Melissa Brock, *Research Associate/Associate Professor of Plant Pathology and Physiology*. BS, 1976, MS, 1979, PhD, 1990, Clemson University
- Ringleb, Alan Hugh, *Professor of Legal Studies*. BA, Graceland College, 1973; PhD, Kansas State University, 1977; JD, University of Kansas, 1981
- Rippy, Douglas Vaughn, *Professor of Textiles*. BS, Clemson University, 1964; MS, Air Force Institute of Technology, 1968; PhD, Clemson University, 1974
- Risso, Humberto, *Lecturer in Spanish*. BA, University of Chile, 1960; MA, University of Michigan, 1963; PhD, University of Miami, 1976
- Robbins, Tina Lynn, *Associate Professor of Management*. BS, Clemson University, 1981; MBA, Winthrop College, 1986; PhD, University of South Carolina, 1991
- Robinette, David Lamar, *Professor of Forest Resources*. BS, 1966, MS, 1968, PhD, 1973, Auburn University
- Robison, Cathy Anne, *Visiting Instructor of Spanish*. BA, Lawrence University, 1980; MA, Southern Illinois University, 1983; MA, University of Georgia, 1996
- Robson, W. Lane M., *Biomedical Professor, GHS/UC Biomedical Cooperative; Medical Director of Pediatric Nephrology, Greenville Hospital System*. BS, 1970, MD, 1973, University of Calgary
- Roby, Charles Kenneth, *Lecturer in Mechanical Engineering*. BS, 1966, MS, 1967, Marquette University
- Rochester, Annette, *Lecturer in School of Nursing*. BS, 1984, MS, 1997, Clemson University
- Rogers, Clarence Dean, Jr., *R. Suetenburg Professor of Textiles*. BS, 1964, MS, 1966, North Carolina State University; PhD, Clemson University, 1978
- Rogers, Steffen H., *Vice President for Academic Affairs and Provost; Professor of Biological Sciences*. BS, Georgia Southern College, 1964; PhD, Vanderbilt University, 1968
- Roldan, Mary Carmen, *Visiting Instructor of Chemistry*. BS, Clemson University, 1990; MS, Furman University, 1992; PhD, Clemson University, 1996
- Rollin, Lucy Waddey, *Associate Professor of English*. BA, University of Kentucky, 1962; MA, University of Georgia, 1972; PhD, Emory University, 1989
- Roof, Mitchell Erwin, *Professor of Entomology, Pee Dee Research and Education Center*. BS, 1968, MS, 1970, PhD, 1974, Kansas State University
- Rook, Suzanne Elaine, *Assistant Librarian*. BA, Clemson University, 1993; MLS, University of Alabama, 1994
- Roper, Ted Jones, *Adjunct Professor of Health Physics*. BS, Wofford College, 1955; MD, Medical University of South Carolina, 1959
- Rose, Patrick Gee, *Instructor of Graphic Communications*. BA, Virginia Polytechnic Institute and State University, 1993; MInED, Clemson University, 1990
- Rosowsky, David Victor, *Associate Professor of Civil Engineering*. BS, Tufts University, 1985; PhD, John Hopkins University, 1990
- Roth, Michelle, *Visiting Instructor of Spanish*. BA, University of Idaho, 1994; MA, Washington State University, 1996
- Roth, Phillip Lewis, *Professor of Management*. BA, University of Tennessee, 1981; MA, 1985, PhD, 1988, University of Houston
- Roudebush, W. E., *Adjunct Assistant Professor of Animal Physiology*. BS, Moorehead State University, 1983; MS, Ohio State University, 1985; PhD, Michigan State University, 1988
- Rozendale, David Swan, *Adjunct Lecturer, Office of the Dean, College of Engineering and Science*. BS, Clemson University, 1957
- Ruppert, Edward Ernst, *Professor of Zoology*. BA, Hartwick College, 1968; PhD, University of North Carolina, 1975
- Ruppert, Mariette Vogel, *Assistant Professor of Biology*. BS, 1962, MS, 1971, Tufts University
- Rushing, James Wayne, *Associate Professor of Horticulture, Coastal Research and Education Center*. BS, Florida Southern College, 1979; MAg, 1981, PhD, 1985, University of Florida
- Russell, Charles Bradley, *Associate Professor of Mathematical Sciences and Management*. BA, University of the South, 1962; MS, 1963, PhD, 1967, Florida State University
- Russell, Harlan B., *Adjunct Professor of Electrical and Computer Engineering*. BS, 1986, MS, 1989, PhD, 1993, University of Illinois
- Ryan, John William, *Chair and Professor of Sociology*. BA, 1971, MA, 1978, West Virginia University; PhD, Vanderbilt University, 1982
- Sabin, Guy Edward, *Professor of Forest Resources*. BS, Clemson University, 1959; ME, Yale University, 1963
- Saccogna, Jeanine Albright, *Director of Wellness Program and Lecturer in Public Health*. BA, University of Akron, 1988; MEd, Kent State, 1993
- Sadler, Edward John, *Adjunct Associate Professor of Crop and Soil Environmental Science*. BS, University of Missouri, 1976; MS, 1978, PhD, 1983, Texas A&M University
- Saha, Subrata, *Professor of Bioengineering; Director of the Bioengineering Alliance of South Carolina; Adjunct Professor, GHS/UC Biomedical Cooperative*. BS, Calcutta University (India), 1963; MS, Tennessee Technological University, 1969; PhD, Stanford University, 1973
- St. John, Caron Hinton, *Associate Professor of Management*. BS, Georgia Institute of Technology, 1976; MBA, 1984, PhD, 1988, Georgia State University
- Saltzman, Matthew Joseph, *Associate Professor of Mathematical Sciences*. BA, Cornell University, 1977; MS, 1982, PhD, 1986, Carnegie-Mellon University
- Samuels, William Degen, *Adjunct Professor of Ceramic and Materials Engineering*. BA, Coe College, 1974; PhD, Georgia Institute of Technology, 1980
- Sanders, Steve Richard, *Associate Professor of Civil Engineering*. BS, U.S. Military Academy, 1978; MS, Auburn University, 1987; PhD, Pennsylvania State University, 1989
- Sandifer, Paul Alan, *Adjunct Professor of Fisheries*. BS, College of Charleston, 1968; PhD, University of Virginia, 1972
- Sarasura, Wayne Alexander, *Assistant Professor of Civil Engineering*. BS, University of California-Berkeley, 1984; MS, 1989, PhD, 1992, Georgia Institute of Technology
- Sass, Ronald Richard, *Assistant Professor of Electrical and Computer Engineering*. BS, University of Toledo, 1989; MS, 1992, PhD, 1997, Michigan State University
- Sattris, Stephen Anthony, *Associate Professor of Philosophy*. BA, University of California, 1969; MA, University of Hawaii, 1971; PhD, Cambridge University (England), 1984
- Sauer, Raymond Dale, Jr., *Professor of Economics*. BA, University of New Mexico, 1979; PhD, University of Washington, 1985
- Saunders, Richard Leroy, Jr., *Associate Professor of History*. BA, Northwestern University, 1962; MA, 1964, PhD, 1971, University of Illinois
- Sauvain, Katherine Jeanes, *Adjunct Assistant Professor in School of Nursing*. BSN, Emory University, 1969; MS, Boston University, 1970
- Savage, Joan Milton, *Adjunct Assistant Professor of Medical Technology, Baptist Medical Center*. BS, Salem College, 1959; MA, Central Michigan University, 1978
- Savage, Rosalie Denise, *Instructor of English*. BA, University of Iowa, 1991; MA, Clemson University, 1995
- Sawyer, Raymond Connell, *Professor of Theatre*. BS, Shippensburg University, 1965; MA, University of Washington, 1971; PhD, University of Illinois, 1975
- Schaffer, Alan, *Professor of History*. BA, New York University, 1958; MA, 1959, PhD, 1962, University of Virginia
- Schalkoff, Robert James, *Professor of Electrical and Computer Engineering*. BS, University of Virginia, 1975; MEng, Rensselaer Polytechnic Institute, 1976; PhD, University of Virginia, 1979
- Schiff, Karen Lisa, *Assistant Professor of English*. AB/AM, Brown University, 1980; MA, 1993, PhD, 1998, University of Pennsylvania
- Schiff, Scott David, *Associate Professor of Civil Engineering and Engineering Mechanics*. BS, ArchEng, University of Cincinnati, 1982; MS, 1984, PhD, 1988, University of Illinois
- Schimek, George L., *Lecturer in Chemistry*. BA, St. Mary's College, 1988; PhD, Iowa State University, 1993
- Schindler, James Edward, *Professor of Zoology*. BS, North Dakota State University, 1966; DPhil, Oxford University (England), 1969

- Schleifer, Lydia Folger**, Associate Professor of Accounting. BA, Davidson College, 1977; PhD, University of Georgia, 1988
- Schmerl, Bradley**, Visiting Assistant Professor of Computer Science. Honours, University of Adelaide (Australia), 1991; PhD, Flinders University of South Australia (Australia), 1997
- Schmidt, John Allen**, Research Associate/Assistant Professor. BS, Washington State University, 1983; MS, 1987, PhD, 1991, Clemson University
- Schmidt, William F. III**, Adjunct Professor of Microbiology. BS, Hobart College, 1965; PhD, 1975; MD, 1976, Duke University
- Schmittou, Charles Daniel**, Associate Professor of Technology and Human Resource Development. BS, 1960, MA, 1975, Austin Peay State University; EdS, Tennessee State University, 1977
- Schneider, William Paul**, Adjunct Associate Professor of Chemistry. BA, Marietta College, 1944; MS, 1946, PhD, 1950, University of Wisconsin
- Schoulties, Calvin**, Director of Regulatory and Public Service Programs; Interim Director, School of Plant, Statistical, and Ecological Sciences; Adjunct Professor of Plant Pathology and Physiology. BS, 1965, PhD, 1971, University of Kentucky
- Schuman, Stanley H.**, Adjunct Professor in School of Nursing. BS, Oberlin College, 1944; MD, Washington University, 1948
- Schwab, Ute**, Adjunct Associate Professor, GHS/UCU Biomedical Cooperative. BS, 1983, MS, 1987, University of Wuerzburg (Germany); PhD, University of Tuebingen (Germany), 1990
- Schwartz, John Howard**, Extension 4-H and Youth Development Specialist; Assistant Professor, 4-H and Youth Development. BS, 1970, MEd, 1975, Pennsylvania State University; PhD, Colorado State University, 1985
- Schwartz, Karen Griffin**, Adjunct Instructor of Food Science. BS, Western Carolina University, 1981; MS, Winthrop College, 1983
- Schwartz, Robert William**, Assistant Professor of Ceramic and Materials Engineering. BS, 1977, MS, 1981, North Carolina State University; PhD, University of Illinois, 1989
- Schwedler, Thomas Edward**, Professor of Fisheries and Microbiology. BS, University of Michigan, 1975; MS, Michigan Technological University, 1977; PhD, Auburn University, 1980
- Scott, Simon William**, Professor of Plant Pathology and Physiology. BSc, Hatfield Polytechnic (Great Britain), 1971; PhD, University of Wales, 1974
- Scott, Thomas Ray**, Director, School of Animal, Biomedical and Biological Sciences; Professor of Animal and Veterinary Sciences. BS, 1976, MS, 1979, Louisiana State University; PhD, University of Georgia, 1983
- Senn, David James**, Associate Professor of Psychology. BA, North Central College, 1962; MA, Northern Illinois University, 1964; PhD, University of Massachusetts, 1967
- Senter, Herman Frank**, Associate Professor of Mathematical Sciences. BS, North Carolina State University, 1965; MS, University of Virginia, 1967; PhD, North Carolina State University, 1973
- Serkiz, Steven M.**, Adjunct Assistant Professor of Environmental Engineering and Science. BS, Furman University, 1985; PhD, Georgia Institute of Technology, 1991
- Shah, Yatish**, Chief Research Officer and Senior Vice Provost for Research and Graduate Studies; Professor of Chemical Engineering. BS, University of Michigan, 1964; MS, 1966, ChE, 1967, ScD, 1969, Massachusetts Institute of Technology
- Shalaby, Shalaby Wahba**, Visiting Assistant Professor of Bioengineering. BSc, Ain Shams University, 1958; MS, 1963, PhD, 1966, PhD, 1967, University of Lowell
- Sharitz, Rebecca Reyburn**, Adjunct Professor of Zoology. BS, Roanoke College, 1966; PhD, University of North Carolina, 1970
- Shelburne, Victor Balmer**, Associate Professor of Forest Resources. BS, 1973, MF, 1975, Duke University; PhD, Clemson University, 1988
- Shepard, Buford Merle**, Resident Director of Coastal Research and Education Center; Professor of Entomology. BS, Middle Tennessee State University, 1966; MS, University of Georgia, 1968; PhD, Texas A&M University, 1971
- Sherar, James Robert**, Adjunct Assistant Professor of Forest Resources. BS, University of Kansas, 1972; MF, Oregon State University, 1978
- Sheriff, Jimmy Don**, Senior Associate Dean, College of Business and Public Affairs; Professor of Accounting. BA, Central Wesleyan College, 1964; MBA, 1970, PhD, 1976, University of Georgia
- Sherouse, George Winthrop**, Adjunct Assistant Professor of Bioengineering. BS, 1977, MS, 1981, University of Florida; PhD, University of North Carolina, 1992
- Shier, Douglas Robert**, Professor of Mathematical Sciences. BA, Harvard University, 1968; PhD, London School of Economics, 1973
- Shilling, Mary Emily**, Adjunct Associate Professor of Nursing. BSN, University of Virginia, 1966; MSN, University of Pennsylvania, 1968
- Shilstone, Frederick William**, Professor of English. BA, Vanderbilt University, 1970; MA, 1972, PhD, 1974, Indiana University
- Shipe, Emerson Russell**, Professor of Crop and Soil Environmental Science. BS, University of Tennessee, 1969; MS, Western Kentucky University, 1970; PhD, Virginia Polytechnic Institute and State University, 1978
- Shively, Jessup MacLean**, Professor of Biochemistry. BS, 1957, MS, 1959, PhD, 1962, Purdue University
- Sias, Frederick Ralph, Jr.**, Adjunct Associate Professor of Electrical and Computer Engineering. BS, 1954, MS, 1959, University of Florida; PhD, University of Mississippi School of Medicine, 1970
- Sieverdes, Christopher Michael**, Professor of Agricultural and Applied Economics; Adjunct Professor of Sociology. BA, University of Richmond, 1966; MS, Virginia Commonwealth University, 1972; PhD, Mississippi State University, 1973
- Sigg, Raymond Anthony**, Adjunct Assistant Professor of Environmental Engineering and Science. BS, Pittsburg State University, 1967; PhD, University of Arkansas, 1976
- Silance, Robert Tad**, Associate Professor of Architecture. BA, Clemson University, 1973; BFA, Temple University, 1978; MArch, Clemson University, 1981
- Sill, Benjamin Lee**, Alumni Distinguished Professor of Civil Engineering. BS, 1967, MS, 1969, North Carolina State University; PhD, Virginia Polytechnic Institute and State University, 1974
- Sill, Lois Potete**, Associate Librarian. BS, University of North Carolina, 1967; MS, North Carolina State University, 1969; MLS, University of South Carolina, 1983
- Silvers, Stuart**, Professor of Philosophy. BA, 1958, MA, 1960, Michigan State University; PhD, University of Pittsburgh, 1963
- Silvestri, Michael Sean**, Visiting Instructor of History. BA, Brown University, 1988, MA, 1991, MPhil, 1993, PhD, 1998, Columbia University
- Simmons, Alvin Maurice**, Adjunct Associate Professor of Entomology. BS, East Carolina University, 1980; MS, 1983, PhD, 1987, University of Kentucky
- Simmons, James Bryan**, Assistant Professor of Technology and Human Resource Development. BS, Western Kentucky University, 1986; MS, Murray State University, 1988; EdD, University of Kentucky, 1994
- Simmons, John Dardis**, Adjunct Professor of Biosystems Engineering. BS, 1973, MS, 1975, University of Tennessee; PhD, Clemson University, 1986
- Simmons, Pamela Robinson**, Instructor of Speech. BA, Howard University, 1972; JD, University of Georgia, 1976
- Simms, Donna Mouritzen**, Visiting Instructor in Mathematical Sciences. BS, Bob Jones University, 1990; MS, Clemson University, 1993
- Simon, Curtis Joseph**, Associate Professor of Economics. BA, College of William and Mary, 1981, MA, 1983, PhD, 1985, State University of New York-Binghamton
- Simon, Frederick Tyler**, Adjunct Professor of Graphic Communications; Professor Emeritus of Textile Science. BS, University of Charleston, 1955; MS, Marshall University, 1958
- Sinclair, Frances Teresa**, Assistant Professor of Music. BM, University of North Carolina, 1986; MM, Florida State University, 1989; PhD, University of North Carolina, 1997
- Singh, Rajendra, D.**, Houser Banks Professor of Electrical and Computer Engineering. BS, Agra University (India), 1965; MS, Meerut University (India), 1968; MS, Dalhousie University (Canada), 1974; PhD, McMaster University (Canada), 1979
- Sinka, Margit Monica**, Professor of German. BA, Baldwin-Wallace College, 1964; MA, Middlebury College, 1965; PhD, University of North Carolina, 1974
- Sinke, Suzanne Marie**, Assistant Professor of History. BA, University of Northern Colorado, 1980; MA, Kent State University, 1983; PhD, University of Minnesota, 1993
- Skaar, Eric Christen**, Associate Professor of Ceramic and Materials Engineering. BS, Alfred University, 1970; PhD, Massachusetts Institute of Technology, 1975; FE
- Skewes, Peter Alan**, Professor of Poultry Science. BS, University of New Haven, 1979; MS, University of Florida, 1982; PhD, Virginia Polytechnic Institute and State University, 1985
- Skipper, Horace Dean**, Professor of Crop and Soil Environmental Science. BS, North Carolina State University, 1964; MS, 1967, PhD, 1969, Oregon State University
- Slann, Martin Wayne**, Chair and Professor of Political Science. BA, University of Miami, 1964; MA, University of Connecticut, 1966; PhD, University of Georgia, 1970
- Slate, Jennifer Clifton**, Instructor of English. BA, 1994, MA, 1996, Clemson University
- Slattery, Bryan Douglas**, Visiting Instructor of English. BA, 1994, MA, 1997, Clemson University
- Smart, Patricia Ann**, Associate Professor in School of Nursing. BSN, Clemson University, 1979; MS, University of South Carolina, 1981; PhD, University of Georgia, 1993
- Smathers, Diane Greene**, Assistant Director and Professor of Family and Youth Development. BS, 1973, MS, 1974, University of Kentucky; EdD, University of Georgia, 1980
- Smathers, Webb Morrow, Jr.**, Associate Professor of Agricultural and Applied Economics. BA, University of North Carolina, 1970; MA, 1975, PhD, 1980, University of Kentucky
- Smink, Jay**, Director, National Dropout Prevention Center; Professor of Curriculum and Instruction. BS, Millersville State College, 1959; MEd, 1961, EdD, 1966, Pennsylvania State University
- Smith, Alton Denny**, Associate Professor of Biology. BS, Mississippi College, 1972; MS, East Texas State University, 1977
- Smith, Bill Ross**, Professor of Crop and Soil Environmental Science. BS, Texas Tech University, 1964; MS, University of Arizona, 1966; PhD, North Carolina State University, 1970
- Smith, Daniel Bruce**, Director, Cooperative Extension Service. BS, Auburn University, 1963; MS, University of Tennessee, 1965; PhD, University of Kentucky, 1973

- Smith, David, *Adjunct Instructor of Biosystems Engineering*. BS, Purdue University, 1982; MS, Iowa State, 1985
- Smith, Dennis Woodrow, Jr., *Assistant Professor of Chemistry*. BS, 1988, PhD, 1992, University of Florida
- Smith, Eddie Roger, *Lecturer in Speech*. BA, 1979, MA, 1981, Bob Jones University
- Smith, Kelly Cox, *Assistant Professor of Philosophy*. BA, Georgia State University, 1986; MA, 1992, PhD, 1994, Duke University
- Smith, Michael, *Adjunct Professor of Wildlife Ecology*. BA, 1960, MA, 1962, California State University; PhD, University of Florida, 1966
- Smith, Samuel Wilson, Jr., *Adjunct Professor of Microbiology, Biomedical Professor, GHS/CU Biomedical Cooperative; Assistant Medical Director, Department of Internal Medicine, Greenville Hospital System*. BS, Davidson College, 1959; MD, University of Pennsylvania, 1963
- Smith, Theodore Isaac, *Adjunct Professor of Fisheries*. BS, Cornell University, 1966; MS, Long Island University, 1968; PhD, University of Miami, 1973
- Smotherman, Mark Kelly, *Associate Professor of Computer Science*. BS, Middle Tennessee State University, 1977; PhD, University of North Carolina, 1984
- Sneed, Larry Andrew, *Assistant Professor of Aerospace Studies*. CAPT, U.S. Air Force; BA, Troy State University, 1987; MBA, Wilmington College, 1992
- Snider, Eric Heinman, *Adjunct Associate Professor of Environmental Engineering and Science*. BS, 1973; MS, 1975, PhD, 1978, Clemson University
- Snider, Thomas Edward, *Adjunct Professor of Agricultural and Applied Economics*. BS, Virginia Polytechnic Institute and State University, 1960; MS, Cornell University, 1962; PhD, University of Minnesota, 1967
- Sonnenfeld, Gerald, *Adjunct Professor, GHS/CU Biomedical Cooperative; Director of Research Immunology and Senior Scientist, Carolinas Medical Center*. BS, City College of New York, 1970; PhD, University of Pittsburgh School of Medicine, 1975
- Southerland, Marcella Brown, *Adjunct Instructor in School of Nursing*. BA, Central Wesleyan College, 1972; Med, Clemson University, 1977
- Spaccante, Stephanie E., *Instructor of Spanish*. BA, Central Washington University, 1994; MA, Washington State University, 1996
- Sparks, Elisa Kay, *Assistant Professor of English*. BA, Bryn Mawr College, 1973; MA, 1978, PhD, 1979, Indiana University
- Sparks, Kathryn Susan, *Visiting Instructor of Curriculum and Instruction*. BA, Berry College, 1977; Med, Clemson, 1996
- Sparks, Peter Robert, *Professor of Civil Engineering and Engineering Mechanics*. BSc, University of Bristol (England), 1968; PhD, University of London, 1974
- Spears, Gail, *General Librarian*. BA, 1980, MA, 1997, Florida State University
- Specht, Winona Lee, *Adjunct Assistant Professor of Entomology*. BS, 1971, MS, 1973, Pennsylvania State University; PhD, Virginia Polytechnic Institute and State University, 1985
- Spencer, Harold Garth, *Alumni Distinguished Professor of Chemistry*. BSE, 1952, MS, 1958, PhD, 1959, University of Florida
- Spinale, Francis Guy, *Adjunct Assistant Professor of Bioengineering*. BS, Northeastern University, 1979; MS, 1984, PhD, 1988, Medical University of South Carolina
- Spira, Timothy P., *Associate Professor of Biological Sciences*. BA, 1975, MA, 1978, California State University; PhD, University of California, 1983
- Spitler, Hugh Donald, *Assistant Professor of Health Science*. BA, 1972, MA, 1974, University of South Florida; PhD, Emory University, 1985
- Spitzer, John Carlisle, *Professor of Animal and Veterinary Sciences*. BS, 1969, MS, 1974, PhD, 1975, Colorado State University
- Spivey, Michael Floyd, *Wachovia Professor of Banking; Professor of Finance*. BA, North Carolina State University, 1973; MBA, East Carolina University, 1978; PhD, University of Tennessee, 1987
- Spooner, John Dewey, *Adjunct Professor of Entomology*. BS, Georgia State University, 1960; MS, 1962, PhD, 1964, University of Florida
- Sprague, Gaye Garrison, *Lecturer in Civil Engineering*. BS, 1978, MS, 1980, Clemson University
- Sprinkle, Stephen Daniel, *Clinical Psychologist/Visiting Assistant Professor*. BA, College of William and Mary, 1982; PhD, University of Virginia, 1989
- Sridharan, V., *Professor of Management*. BE, Madurai University, 1975; PhD, University of Iowa, 1987
- Stasiukaitis, Sara Elizabeth, *Visiting Instructor of Mathematical Sciences*. BS, Furman University, 1995; MS, Clemson University, 1997
- Stecker, Pamela Marie, *Assistant Professor of Special Education*. BS, 1983, MEd, 1988, East Tennessee State University; PhD, Vanderbilt University, 1993
- Steirer, William Frank, Jr., *Associate Professor of History*. BA, Gettysburg College, 1959; MA, 1962, PhD, 1972, University of Pennsylvania
- Stephens, Benjamin Read, *Associate Professor of Psychology*. BS, University of Georgia, 1979; PhD, University of Texas, 1985
- Stephens, Linda S., *Assistant Professor of Sociology*. BA, University of Wisconsin, 1990; MA, 1992, PhD, 1996, University of Washington
- Stevens, Bonnie Westbury, *Director of Leisure Skills; Lecturer in Parks, Recreation, and Tourism Management*. BS, 1976, MRPA, 1978, EdD, 1997, Clemson University
- Stevens, Deborah Ann, *Associate Professor of Curriculum and Instruction*. BS, Madison College, 1977; MS, 1985, EdD, 1989, University of Tennessee
- Stevens, John Herbert, Jr., *Lecturer in Parks, Recreation, and Tourism Management*. BSE, University of Florida, 1975; MRPA, Clemson University, 1978
- Stevenson, Dennis Elliott, *Associate Professor of Computer Science*. BA, Eastern Michigan University, 1965; MS, Rutgers University, 1975; PhD, Clemson University, 1983
- Stewart, Charles Richard, *Adjunct Professor of Legal Studies*. BA, Davidson College, 1976; JD, Vanderbilt University, 1979
- Stewart, Mark Gerard, *Adjunct Associate Professor of Civil Engineering*. PhD, University of Newcastle (Australia), 1988
- Stewart, Wayne H., Jr., *Assistant Professor of Management*. BSBA, 1984, MBA, 1988, Western Carolina University; PhD, University of North Texas, 1995
- Stica, Robert P., *Biomedical Associate Professor, GHS/CU Biomedical Cooperative; Associate Director of Surgical Education, Greenville Hospital System*. AA, Springfield Technical Community College, 1976; BA, University of New Hampshire, 1979; MD, University of Connecticut School of Medicine, 1984
- Stockham, James Allen, *Associate Professor of Art*. BFA, 1970, MFA, 1973, Wayne State University
- Stoddard, Allison Kesler, *Visiting Instructor of Mathematical Sciences*. BA, 1985, MS, 1990, Clemson University
- Stone, Dewitt Boyd, Jr., *Assistant Vice President for Academic Affairs; Lecturer in Engineering*. BS, 1962, MS, 1964, University of Tennessee; PhD, Louisiana State University, 1969
- Stone, Kenneth, *Adjunct Assistant Professor of Biosystems Engineering*. BS, 1981, MS, 1985, University of Georgia; PhD, University of Florida, 1987
- Stoneman, L. Alexa, *Assistant Librarian*. BA, University of Toronto, 1991; MA, University of London, 1992; MLIS, University of Western Ontario, 1996
- Straka, Thomas James, *Professor of Forest Resources*. BS, 1972, MS, 1973, University of Wisconsin; MBA, University of South Carolina, 1978; PhD, Virginia Polytechnic Institute and State University, 1981
- Straup, Robert Allen, *Adjunct Assistant Professor of Bioengineering*. BS, Lehigh University, 1969; DMD, Medical University of South Carolina, 1977
- Stratton, Wade Alan, *Lecturer in Mathematical Sciences*. BS, Bob Jones University, 1991; MS, Clemson University, 1993
- Stringer, William Clayton, *Associate Professor of Crop and Soil Environmental Science*. BSA, 1968, MS, 1972, University of Georgia; PhD, Virginia Polytechnic Institute and State University, 1979
- Stroud, Ronald Kevin, *Assistant Professor of Aerospace Studies*. CAPT, U.S. Air Force; BS, University of West Florida, 1990; MBA, College of Santa Fe, 1993
- Stroup, David James, *Assistant Professor of Biology*. BS, 1972, MS, 1975, PhD, 1980, University of Akron
- Stuart, Steven Jennings, *Assistant Professor of Chemistry*. BS, University of Delaware, 1990; PhD, Columbia University, 1996
- Sturkie, Douglas Kinly III, *Associate Professor of Sociology*. BA, Newberry College, 1970; MSW, University of South Carolina, 1973; PhD, University of Southern California, 1979
- Stutzenberger, Fred John, *Professor of Microbiology*. BS, Bellarmine-Ursuline College, 1962; MS, University of Houston, 1964; PhD, Michigan State University, 1967
- Suarez, Jose Ignacio, *Professor of Spanish and Portuguese*. BA, 1972, MA, 1974, University of South Florida; PhD, University of New Mexico, 1981
- Suggs, Henry Lewis, *Professor of History*. BA, 1963, MA, 1968, North Carolina Central University; PhD, University of Virginia, 1976
- Sullivan, Frances Evella, *Associate Professor of Mathematical Sciences*. BS, South Carolina State College, 1965; MS, University of South Carolina, 1968; PhD, City University of New York, 1980
- Sullivan Michael Jack, *Professor of Entomology, Edisto Research and Education Center*. BS, Texas Tech University, 1967; MS, 1971, PhD, 1973, North Carolina State University
- Sullivan, Timothy M., *Biomedical Associate Professor, GHS/CU Biomedical Cooperative; The Cleveland Clinic Foundation, Staff of Vascular Surgery, Greenville Hospital System*. BS, MD, Youngstown State University/Northeastern Ohio/University College of Medicine, 1983
- Summers, Timothy Paul, *Associate Professor of Management*. BA, 1976, MBA, 1978, West Virginia University; PhD, University of South Carolina, 1986
- Sun, Ya-Ping, *Associate Professor of Chemistry*. BS, Zhejiang Institute of Technology (China), 1982; MS, Zhejiang University (China), 1985; PhD, Florida State University, 1989
- Surak, John Godfrey, *Professor of Food Science*. BS, 1971, MS, 1972, PhD, 1974, University of Wisconsin
- Surver, William Merle, *Chair and Professor of Biology Program*. BS, St. Francis College, 1966; PhD, University of Notre Dame, 1974
- Sutton, Russell Wayne, *Professor of Agricultural and Applied Economics*. BS, 1963, MS, 1967, PhD, 1974, University of Kentucky
- Swaney, Danita Rigdon, *Lecturer in Graphic Communications*. BS, Clemson University, 1998
- Swank, Wayne Thomas, *Adjunct Professor of Forest Resources*. BS, West Virginia University, 1958; MF, 1960, PhD, 1972, University of Washington

- Swanson, Elizabeth**, *Lecturer in School of Nursing*. BS, Baylor University, 1975; MSN, 1990, MPH, 1990, Emory University
- Sweeney, John Robert**, *Chair and Professor of Wildlife Management*. BS, 1967, MS, 1971, University of Georgia; PhD, Colorado State University, 1975
- Swindell, David**, *Assistant Professor of Political Science*. BA, University of Texas, 1988; PhD, Indiana University, 1997
- Switzer, Deborah Marie**, *Associate Professor of Educational Foundations*. BA, University of Texas, 1976; MEd, 1987, PhD, 1993, University of Illinois
- Switzer, Fred Smith III**, *Associate Professor of Psychology*. BA, University of Texas, 1975; MS, Lamar University, 1982; PhD, University of Illinois, 1988
- Szmurlo, Karyna Maria**, *Associate Professor of French*. BA, 1965, MA, 1967, University of Warsaw (Poland); MA, 1977, PhD, 1981, Rutgers University
- Tagliarini, Gene Arthur**, *Research Associate/Assistant Professor of Computer Science*. BA, 1970, MA, 1971, University of South Florida; PhD, Clemson University, 1990
- Tai, Lolly**, *Professor of Landscape Architecture*. BS, Cornell University, 1977; MLA, Harvard University, 1979
- Tainter, Franklin Hugh**, *Professor of Forest Resources*. BSF, University of Montana, 1964; MS, 1968, PhD, 1970, University of Minnesota
- Tamura, Roberto Fumio**, *Associate Professor of Economics*. BS, College of William and Mary, 1981; MA, 1983, PhD, 1988, University of Chicago
- Taylor, Charlotte Murrow**, *Associate Professor of Counseling*. BS, Jacksonville University, 1969; MA, The Citadel, 1976; EdD, University of Memphis, 1992
- Taylor, Dennis Stephen**, *Associate Librarian*. BA, Piedmont College, 1977; MA, University of Georgia, 1981; MLN, Emory University, 1986
- Taylor, Eleanor Perry**, *Adjunct Instructor of Public Health*. BS, Alfred University, 1963; MS, Clemson University, 1983
- Taylor, Paul Michael**, *Adjunct Professor of Mechanical Engineering*. BA, Cambridge University, 1972; MS, 1973, PhD, 1976, University of Manchester (England)
- Taylor, Spence M.**, *Biomedical Associate Professor, GHS/CU Biomedical Cooperative; Associate Director of Surgical Education, Greenville Hospital System*. BS, Clemson University, 1979; MD, Medical University of South Carolina, 1983
- Taylor, Theodore David**, *Associate Professor of Ceramic and Materials Engineering*. BS, Alfred University, 1963; MS, 1966, PhD, 1971, Pennsylvania State University; PE
- Taylor-Carter, Mary Anne**, *Associate Professor of Psychology*. BA, Western Kentucky, 1983; MS, Virginia Polytechnic Institute and State University, 1985; PhD, University of Akron, 1990
- Temples, Tom Joe**, *Adjunct Assistant Professor of Geological Sciences*. BS, Clemson University, 1976; MS, University of Georgia, 1978; PhD, University of South Carolina, 1996
- Tesolowski, Dennis Gregory**, *Professor of Technology and Human Resource Development*. BS, 1967, MS, 1968, University of Wisconsin; EdD, Auburn University, 1978
- Tessama, Guebre Xabihier**, *Professor of Physics*. BS, 1974, MS, 1975, PhD, 1979, University of Grenoble (France)
- Testin, Robert Francis**, *Chair and Professor of Packaging Science; Professor of Biosystems Engineering*. BChE, University of Detroit, 1958; MS, 1962, PhD, 1965, University of Pittsburgh
- Thames, Brenda Jumper**, *Associate Professor of Family and Youth Development*. BS, Mississippi University, 1976; MEd, 1985, EdD, 1992, Clemson University
- Thies, Judy**, *Adjunct Professor of Plant Pathology and Physiology*. BS, 1972, MS, 1982, PhD, 1988, University of Minnesota
- Thies, Mark Charles**, *Professor of Chemical Engineering*. BChE, Georgia Institute of Technology, 1977; PhD, University of Delaware, 1985; PE
- Thomas, Claude Earl**, *Adjunct Professor of Plant Pathology and Physiology*. BS, Wofford College, 1962; MS, 1964, PhD, 1966, Clemson University
- Thomas, Ronald Lewis**, *Professor of Packaging Science and Food Science*. BS, Gardner-Webb College, 1973; MS, 1975, PhD, 1980, Clemson University
- Thomason, Deborah Jackson**, *Assistant Professor of Family and Youth Development*. BS, 1977, MEd, 1979, University of Georgia; EdD, Clemson University, 1992
- Thomason, Ralph Paul**, *Assistant Professor of Theatre*. BA, South Carolina State College, 1977; MEd, Bowie State College, 1982; MFA, University of North Carolina, 1990
- Thompson, Carl Eugene**, *Professor of Animal Science*. BS, 1963, MS, 1968, Pennsylvania State University; PhD, Virginia Polytechnic Institute and State University, 1971
- Thompson, Carl Stassen**, *Professor of Agricultural and Applied Economics*. BS, MS, 1968, Murray State University; PhD, University of Kentucky, 1973
- Thompson, Gerald Richard**, *Professor of Economics*. BA, University of South Florida, 1966; PhD, University of Virginia, 1972
- Thompson, J. David**, *Adjunct Assistant Professor of Bioengineering*. BS, Auburn University, 1975; DM, Vanderbilt University School of Medicine, 1979
- Thompson, Lonny Lee**, *Assistant Professor of Mechanical Engineering and Engineering*. BS, University of California, 1985; MS, 1989, PhD, 1994, Stanford University
- Thompson, Sharon Wolff**, *Associate Professor in School of Nursing*. BSN, Murray State University, 1968; MSN, University of Kentucky, 1972
- Thornberg, Christopher E.**, *Assistant Professor of Economics*. BS, State University of New York-Buffalo, 1989; PhD, University of California-Los Angeles, 1997
- Thorson, Mary Jean**, *Assistant Professor in School of Nursing*. BSN, 1966, MSN, 1977, University of Maryland; PhD, University of North Carolina, 1995
- Thurmond, James Strom**, *Adjunct Professor of Political Science*. BS, Clemson University, 1923
- Thurmond, Nancy Moore**, *Adjunct Professor in School of Nursing*. BA, University of South Carolina, 1968
- Thurston, Ronald James**, *Professor of Animal and Veterinary Sciences*. BA, 1966, MS, 1969, University of Arkansas; PhD, University of Missouri, 1976
- Tillinghast, David Charles**, *Professor of English*. BA, Louisiana Polytechnic Institute, 1961; MA, University of Wisconsin, 1963; PhD, University of South Carolina, 1974
- Timms, Janet L.**, *Associate Professor in School of Nursing*. BSN, 1981, MSN, 1986, Clemson University; EdD, University of Georgia, 1992
- Tinsley, Joseph Lee**, *Lecturer of Geological Sciences*. BA, 1986, MA, 1989, MS, 1994, Clemson University
- Tipper, David W.**, *Adjunct Associate Professor of Electrical and Computer Engineering*. BS, Virginia Polytechnic Institute and State University, 1980; MS, 1984, PhD, 1988, University of Arizona
- Titus, Sylvia Smith**, *Lecturer in English*. BA, Southwestern State College, 1968; MA, Oklahoma State University, 1970
- Toler, Joe Ernest**, *Professor of Experimental Statistics*. BS, 1966, MSA, 1968, University of Georgia; PhD, Clemson University, 1990
- Tollison, C. David**, *Visiting Professor of Psychology*. BA, Clemson University, 1975; MS, 1977, PhD, 1979, University of Georgia
- Tomasso, Joseph Richard, Jr.**, *Professor of Aquaculture*. BS, University of Tennessee-Martin, 1974; MS, Middle Tennessee State University, 1978; PhD, Memphis State University, 1981
- Tonkyn, David William**, *Associate Professor of Biological Sciences*. BA, 1976, MA, 1978, PhD, 1985, Princeton University
- Torrence, Alan Kendrick**, *Head, Agricultural Chemical Services Department; Lecturer in Food Science*. BS, Davidson College, 1965; PhD, Clemson University, 1971
- Tosini, Kimberly Ann**, *Lecturer in Special Education*. BA, Providence College, 1995; MEd, Clemson University, 1998
- Trappell, Jerry Eugene**, *Dean, College of Business and Public Affairs; Professor of Accounting*. BS, 1968, MS, 1970, Clemson University; PhD, University of Georgia, 1977; CPA
- Tritt, Terry Michael**, *Assistant Professor of Physics and Astronomy*. AS, Anderson Junior College, 1979; BA, 1980, PhD, 1985, Clemson University
- Trotter, Kenneth Wayne**, *Adjunct Professor of Agricultural and Applied Economics*. BA, Foreign Service Institute, 1967
- Turner, Albert Joseph, Jr.**, *Professor of Computer Science*. BS, 1961, MS, 1966, Georgia Institute of Technology; MS, 1972, PhD, 1976, University of Maryland
- Turner, James David**, *Adjunct Assistant Professor of Zoology*. BS, Wake Forest University, 1973; PhD, Duke University, 1978
- Turner, Raymond Clyde**, *Alumni Distinguished Professor of Physics*. BS, Carnegie Institute of Technology, 1960; PhD, University of Pittsburgh, 1966
- Turnipseed, Samuel Guy**, *Professor of Entomology, Edisto Research and Education Center*. BA, University of North Carolina, 1956; MS, Clemson University, 1958; PhD, North Carolina State University, 1961
- Tyler, Peggy J.**, *Assistant Librarian*. BS, Johnson State College, 1983; MLS, State University of New York-Albany, 1988
- Tyrrrell, Richard Alan**, *Assistant Professor of Psychology*. BA, Hartwick College, 1985; MS, 1989, PhD, 1993, Pennsylvania State University
- Tzeng, Tuen-Rong**, *Lecturer of Microbiology and Molecular Medicine*. BS, Tunghai University, 1985; PhD, Clemson University, 1998
- Underwood, David Glenn**, *Director of Assessment; Assistant Professor of Educational Leadership*. BS, 1972, MPS, 1978, MA, 1979, Western Kentucky University; PhD, Indiana University, 1985
- Uysal, Muzaffer**, *Adjunct Associate Professor of Parks, Recreation, and Tourism Management*. BS, Ankara Academy of Economics and Commercial Sciences, 1976; MBA, University of New Haven, 1979; PhD, Texas A&M University, 1983
- Van Kooten, Theo Gerrit**, *Research Associate/Assistant Professor of Bioengineering*. BS, 1987, MS, 1989, PhD, 1993, University of Groningen (Netherlands)
- Van Lear, David Hyde**, *Robert Adger Bowen Professor of Forest Resources*. BS, 1963, MS, 1965, Virginia Polytechnic Institute and State University; PhD, University of Idaho, 1969
- Van Sell, Sharon D. M.**, *Associate Professor in School of Nursing*. BSN, Murray State University, 1968; MEd, Memphis State University, 1971; MS, University of Colorado, 1985; EdD, University of Denver, 1986
- Vander Mey, Brenda Joyce**, *Associate Professor of Sociology*. BA, Trinity Christian College, 1978; MA, 1981, PhD, 1984, Mississippi State University

- Vander Mey, Gerald, *Campus Planner, Adjunct Professor of Planning and Landscape Architecture*. BA, 1982, MS Arch, 1984, Mississippi State University
- Vatalaro, Michael Vincent, *Professor of Art*. BFA, University of Akron, 1972; MFA, Alfred University, 1976
- Vaughn, Edward Allen, *Professor of Textiles*. BS, Lynchburg College, 1962; MS, Institute of Textile Technology, 1964; PhD, Victoria University of Manchester (England), 1969; CTEXT, FTI
- Vergano, Peter Joseph, *Professor of Packaging Science*. BS, BA, 1965, Rutgers University; ScD, Massachusetts Institute of Technology, 1969
- Vines, Dwight Theodore, *Associate Professor of Animal and Veterinary Sciences*. BS, 1968, MS, 1972, University of Arkansas; PhD, Michigan State University, 1976
- Voelker, Evelyn Cecilia, *Alumni Distinguished Professor of Art and Architectural History*. BA, Marymount College, 1958; MA, Catholic University, 1960; PhD, Syracuse University, 1977
- Von Recum, Andreas Freiherr, *Adjunct Professor of Bioengineering*. BS, University of Giessen (Germany), 1965; DVM, 1968, DMVet, 1969, Free University of Berlin; PhD, Colorado State University, 1974
- Wagner, John Robert, *Associate Professor of Geology*. BS, Muhlenberg College, 1970; MEd, 1972, MA, 1976, Temple University; PhD, University of South Carolina, 1993
- Wagner, John Russell, *Assistant Professor of Mechanical Engineering*. BS, 1983, MS, 1985, State University of New York-Buffalo; PhD, Purdue University, 1989
- Wagner, Thomas E., *Greenville Hospital System Distinguished Professor of Microbiology and Molecular Medicine*. BA, Princeton University, 1964; PhD, Northwestern University, 1966
- Wainscott, Stephen Henry, *Professor of Political Science*. BA, St. Andrews Presbyterian College, 1967; MA, 1972, PhD, 1976, Miami University
- Waldrop, Thomas Allan, *Adjunct Assistant Professor of Forest Resources*. BS, 1978, MS, 1980, Clemson University; PhD, University of Tennessee, 1983
- Waldvogel, Jerry Alan, *Associate Professor of Biology*. BS, Stanford University, 1976; PhD, Cornell University, 1981
- Walker, Gerald Lee, *Associate Professor of Art and Architectural History*. BArch, Clemson University, 1966; MCP, University of Pennsylvania, 1969; MS, 1984, PhD, 1993, University of Pennsylvania
- Walker, Ian David, *Associate Professor of Electrical and Computer Engineering*. BS, University of Hull (England), 1983; MS, 1985, PhD, 1989, University of Texas-Austin
- Walker, Joan Lynette, *Adjunct Assistant Professor of Forest Resources*. BS, Lebanon Valley College, 1975; MS, 1980, PhD, 1985, University of North Carolina
- Walker, Meredith Lynne, *Lecturer in English*. BA, University of South Carolina, 1984; MAEd, Western Carolina University, 1987
- Walker, Susan Wise, *Instructor of English*. BA, University of South Carolina, 1975; MA, Middlebury College, 1984
- Wallace, Myles Stuart, *Professor of Economics*. BA, 1968, MA, 1974, PhD, 1976, University of Colorado
- Wallace, Susan Ulmer, *Professor of Crop and Soil Environmental Science*. BS, 1973, MS, 1975, University of Alabama; PhD, Iowa State University, 1979
- Waller, Neil Garvin, *Professor of Finance*. BS, 1975, MA, 1978, University of Florida; PhD, University of Texas, 1986; MAI
- Wang, Samuel, *Professor of Art*. BA, Augustana College, 1964; MFA, University of Iowa, 1966
- Wang, Ting, *Professor of Mechanical Engineering*. BS, Tatung Institute of Technology (Taiwan), 1977; MS, State University of New York, 1980; PhD, University of Minnesota, 1984
- Ward, Carol Marie, *Professor of English*. BA, 1973, MA, 1976, University of South Carolina; PhD, University of Tennessee, 1981
- Ward, David Andrew, *Professor of Sociology*. BA, Florida Atlantic University, 1971; MA, 1973, PhD, 1975, University of Florida
- Ward, Jeanne Ellen, *Lecturer in School of Nursing*. BS, St. Joseph's College, 1983; MS, University of Minnesota, 1985
- Ward-Vaughn, Virginia Louise Schallenberg, *Assistant Professor of Legal Studies*. BA, University of Hawaii, 1982; JD, George Washington University, 1987
- Ward, William Augustus, *Professor of Agricultural and Applied Economics*. BA, 1965, BS, 1967, Clemson University; PhD, Michigan State University, 1972
- Warner, Daniel Douglas, *Professor of Mathematical Sciences*. BS, 1965, MA, 1966, Arizona State University; PhD, University of California, 1974
- Warner, John Terry, *Professor of Economics*. BA, Wake Forest University, 1969; ME, 1972, PhD, 1976, North Carolina State University
- Warner, Mellie LaRoche, *Research Associate/Assistant Professor of Agricultural and Applied Economics*. BS, University of South Carolina, 1971; ME, 1975, PhD, 1984, North Carolina State University
- Warner, Richard Dudley, *Chair and Professor of Geological Sciences*. BS, Massachusetts Institute of Technology, 1966; PhD, Stanford University, 1971
- Warner, Sean, *Assistant Professor of Social Studies Education*. BA, City College of New York, 1993; MEd, 1995, EdD, 1997, University of Massachusetts
- Washington, Thedis Shevern, *Assistant Librarian*. BS, Tuskegee Institute, 1984; MLS, Louisiana State University, 1995
- Watt-Gilstrap, Paula, *Lecturer in School of Nursing*. BS, 1993, MS, 1994, Clemson University
- Weatherford, Carol Green, *Associate Professor of Educational Foundations*. BS, 1972, MS, 1973, EdS, 1975, University of Georgia; EdD, North Carolina State University, 1984
- Weatherford, David Edgar, Jr., *Professor of Family and Youth Development*. BS, 1972, MEd, 1978, University of Georgia; EdD, North Carolina State University, 1981
- Weaver, Barbara Eby, *Instructor of English*. BA, 1986, MA, 1988, Wright State University
- Weekes, Alan Frank, *Visiting Instructor*. BS, 1977, MS, 1981, University of New York; PhD, University of South Carolina, 1993
- Weems, Jerome John, Jr., *Adjunct Associate Professor of Microbiology, Biomedical Associate Professor, Associate Director of Internal Medicine, Greenville Hospital System*. BA, Rhodes College, 1977; MD, University of Tennessee, 1981
- Wehrenberg, William Busse, *Dean, College of Agriculture, Forestry, and Life Sciences; Professor of Biological Sciences*. BS, Valparaiso University, 1973; MS, Purdue University, 1975; PhD, University of Wisconsin-Madison, 1978
- Wei, Yanzhang, *Assistant Professor of Molecular Medicine*. BS, Shenyang Normal University (China), 1982; MS, Institute of Hydrobiology of Chinese Academy of Sciences (China), 1985; PhD, Ohio University, 1996
- Weir, Eldon Lee, *Professor of Graphic Communications*. BS, Northwest Missouri State University, 1962; MA, Ball State University, 1963; EdD, Arizona State University, 1970
- Weir, Julia Katherine, *Lecturer in Curriculum and Instruction*. BS, Northwest Missouri State University, 1962; MEd, Iowa State University, 1990
- Weisskopf, Carol Pilz, *Assistant Professor of Environmental Toxicology*. BA, 1976, PhD, 1990, University of California
- Wells, Gary James, *Chair and Professor of Agricultural and Applied Economics*. BA, University of North Carolina, 1973; ME, 1974, PhD, 1977, North Carolina State University
- Welton, Ralph Edward, Jr., *Director and Professor of Accounting*. BA, Anderson University, 1976; MS, 1978, PhD, 1982, Louisiana State University
- Wenner, Elizabeth Lewis, *Adjunct Assistant Professor of Fisheries*. BS, Mary Washington College, 1972; MA, 1975, PhD, 1979, College of William and Mary
- Wentworth, William Martin, *Professor of Sociology*. BA, Indiana University, 1972; MA, University of Maryland, 1974; PhD, University of Virginia, 1978
- Wesley, Kathryn, *Assistant Librarian*. BA, Northeast Louisiana University, 1977; MLIS, University of Southern Mississippi-Hattiesburg, 1977
- West, William Elmer, *Chair, Department of Graphic Communications; Professor of Technology and Human Resource Development and Graphic Communications*. BS, Ohio University, 1958; MA, 1964, PhD, 1969, Ohio State University
- Westall, James Mason, Jr., *Professor of Computer Science*. BS, Davidson College, 1968; PhD, University of North Carolina, 1973
- Wetsel, Margaret Ann, *Assistant Professor in School of Nursing*. BSN, Indiana University, 1978; MS, Ohio State University, 1979; PhD, University of Texas-Austin, 1988
- Whaley, David Belton, Jr., *Adjunct Assistant Professor of Parks, Recreation, and Tourism Management*. BS, Allen University, 1966; MS, North Carolina Central University, 1975; PhD, Clemson University, 1991
- Wheeler, Alfred George, Jr., *Adjunct Professor of Entomology*. BA, Grinnell College, 1966; PhD, Cornell University, 1971
- Wheeler, Alfred Portius, *Professor of Zoology*. BS, Butler University, 1969; PhD, Duke University, 1975
- Welchel, Georgia Annette, *Lecturer in Nursing*. BS, 1984, BS, 1990, Clemson University
- Whetstone, Jack Moore, Jr., *Associate Professor of Fisheries*. BS, 1975, MS, 1978, Clemson University
- White, Charlie Raymond, Jr., *Associate Professor of Parks, Recreation, and Tourism Management*. BS, North Carolina State University, 1966; MS, Indiana University, 1967
- White, Curtis Dale, Sr., *Associate Professor of Agricultural Education*. BS, Clemson University, 1980; MS, 1985, PhD, 1988, University of Missouri
- White, Mervin Forrest, *Associate Professor of Sociology*. BS, 1962, MS, 1965, Brigham Young University; PhD, University of Kentucky, 1971
- White, Richard L., *Biomedical Associate Professor, GHSCU Biomedical Cooperative*. BA, Cornell University, 1982; MD, Columbia University College of Physicians and Surgeons, 1986
- Whitesides, John Franklin, *Research Associate/Assistant Professor of Animal and Veterinary Sciences*. BS, 1975, MS, 1978, PhD, 1990, Auburn University
- Whitwell, Ted, *Chair and Professor of Horticulture*. BS, University of Tennessee, 1972; MS, 1974, PhD, 1977, Oklahoma State University
- Wicks, Bruce Erik, *Adjunct Assistant Professor of Parks, Recreation, and Tourism Management*. BS, 1970, MA, 1979, State University of New York-Brockport; PhD, Texas A&M University, 1986
- Wiecek, Margaret Maria, *Associate Professor of Mathematical Sciences*. BS, 1979, PhD, 1984, University of Mining and Metallurgy (Poland)

- Wigley, Thomas Bently, Jr., *Adjunct Associate Professor of Aquaculture, Fisheries, and Wildlife*. BS, 1977, MS, 1977, PhD, 1981, Mississippi State University
- Wilkerson, Julie, *Lecturer in Architectural Studies*. BA, Auburn University, 1983; MArch, Clemson University, 1990
- Wilkinson, Nancy Smith, *Director of Education Field Experience; Lecturer in Curriculum and Instruction*. BA, Florida State University, 1963; MEd, Clemson University, 1972
- Wilkinson, Thomas Ross, *Professor of Animal and Veterinary Sciences and Microbiology*. BS, University of Notre Dame, 1959, MS, University of Maryland 1962; PhD, Washington State University, 1970
- Williams, Calvin Lawrence, *Associate Professor of Mathematical Sciences*. BS, College of Charleston, 1981; PhD, Medical University of South Carolina, 1987
- Williams, Dwight Charles, *Adjunct Assistant Professor of Entomology*. BS, 1977, MS, 1979, University of Arkansas; PhD, Louisiana State University, 1984
- Williams, Eunice Campbell, *Lecturer in Educational Foundations*. BA, 1983, MEd, 1991, PhD, 1996, Clemson University
- Williams, Janice Gale, *Professor of Psychology*. BA, 1980, MA, 1982, Wake Forest University; PhD, Vanderbilt University, 1985
- Williams, Marty Harrison, *Visiting Lecturer in Management*. BA, 1975, MEd, 1977, Clemson University
- Williams, Princess Lucille, *Instructor of Speech*. BS, 1995, MS, 1997, Syracuse University
- Williams, Ronald Ralph, *Adjunct Professor of Chemistry*. BS, University of South Carolina, 1977; PhD, University of Georgia, 1981
- Williams, Thomas Michael, *Professor of Forest Resources*. Belle W. Baruch Forest Science Institute. BS, 1969, MS, 1971, PhD, 1976, University of Minnesota
- Williamson, Robert Elmore, *Professor of Biosystems Engineering*. BS, 1959, MS, 1964, Clemson University; PhD, Mississippi State University, 1972; PE
- Willingham, Russell, *Instructor of French*. BA, Clark College, 1963; MA, Atlanta University, 1967
- Willoughby, Deborah Freeman, *Assistant Professor in School of Nursing*. BS, 1976, MS, 1986, Clemson University; PhD, Georgia State University, 1995
- Wills, William, *Adjunct Assistant Professor of Entomology*. BS, Fresno State College, 1959; MS, Pennsylvania State University, 1965
- Wilson, Seal Nisbet, *Visiting Assistant Professor of Special Education*. BS, Winthrop College, 1988; MA, Furman University, 1991; PhD, University of Southern Mississippi, 1994
- Winchell, Donna Beth, *Professor of English*. BA, 1974, MA, 1976, Florida State University; PhD, Texas Christian University, 1983
- Winchell, Mark Royden, *Professor of English*. BA, 1971, MA, 1973, West Virginia University; PhD, Vanderbilt University, 1978
- Wing, Rod Anthony, *Associate Professor of Crop and Soil Environmental Science and Biological Sciences; Coker Endowed Chair of Molecular Genetics*. BA, University of California-Berkeley, 1980; PhD, University of California-Davis, 1987
- Winters, Alan Joseph, *Professor of Accounting*. BS, 1966, MBA, 1970, Northeast Louisiana University; PhD, Texas Tech University, 1974; CPA
- Wise, John Macgregor, *Assistant Professor of Speech*. BA, Trinity University, 1988; MA, 1990, PhD, 1995, University of Illinois-Urbana-Champaign
- Withoeft, Judith, *Lecturer in Public Health*. BS, 1975, MS, 1977, Western Illinois University
- Wittig, Martha C., *Visiting Professor of Sociology*. BS, 1988, MA, 1990, University of New Orleans; PhD, Tulane University, 1994
- Wolak, Francis John, *Professor of Biosystems Engineering*. BS, 1976, PhD, 1979, Michigan State University
- Wood, Gene Wayne, *Professor of Forest Wildlife Ecology*. BS, Virginia Polytechnic Institute and State University, 1963, MS, 1966, PhD, 1971, Pennsylvania State University
- Woodard, James David, *Professor of Political Science*. BS, Ahlbrecht Christian College, 1970; MA, American University, 1973; PhD, Vanderbilt University, 1978
- Woodell, Charles Harold, *Professor of English*. BA, 1963, MA, 1964, Wake Forest University; PhD, University of North Carolina, 1974
- Woodward-Deitrich, Denise Carol, *Lecturer in Art*. BFA, Wichita State University, 1990; MFA, New York State College of Ceramics-Alfred University, 1992
- Wooten, Thomas Ernest, *Alumni Distinguished Professor of Forest Resources*. BA, Catawba College, 1962; MF, Duke University, 1965; PhD, North Carolina State University, 1967
- Work, Paul Alexander, *Associate Professor of Civil Engineering*. BS, 1986, MS, 1987, University of California; PhD, University of Florida, 1992
- Worrell, Michael Anthony, *Associate Professor of Animal and Veterinary Sciences, Edisto Research and Education Center*. BS, 1978, MS, 1982, University of Florida; PhD, University of Nebraska, 1985
- Wourms, John Peter Barton, *Professor of Zoology*. BS, 1958, MS, 1960, Fordham University; PhD, Stanford University, 1966
- Wueste, Daniel Ernest, *Associate Professor of Philosophy*. BA, 1976, MA, 1979, University of Wisconsin; PhD, Washington University, 1985
- Wynn, Eddie Dowell, *Associate Professor of Agricultural and Applied Economics*. BA, Howard University, 1971; MCRP, Clemson University, 1974
- Wynn, Mable Hill, *Assistant Professor of Parks, Recreation, and Tourism Management*. BS, Hampton Institute, 1964; MS, Springfield College, 1971
- Xiang, Lanxin, *Associate Professor of Political Science*. BA, Fudan University (China), 1982; MA, 1985, PhD, 1990, Johns Hopkins University
- Xu, Xiao-Bang, *Associate Professor of Electrical and Computer Engineering*. BS, Tsinghua University (China), 1968; PhD, University of Mississippi, 1985
- Yandle, Thomas Bruce, Jr., *Alumni Distinguished Professor of Economics*. BA, Mercer University, 1955; MBA, 1968, PhD, 1970, Georgia State University
- Yarrow, Gregory Keith, *Associate Professor of Wildlife*. BS, University of Southern Mississippi, 1977; MS, Mississippi State University, 1979; DF, Stephen F. Austin University, 1987
- Yates, George Kenneth, *Adjunct Professor of Physics and Astronomy*. AB, Harvard College, 1950; MS, 1955, PhD, 1964, University of Chicago
- Yilmaz, Umit, *Associate Professor of Planning Studies*. BArch, 1979, MA, 1981, PhD, 1988, Istanbul Technical University
- Yoon, Tae-Hee, *Adjunct Professor of Agricultural and Applied Economics*. LLB, Dong Kuk University (Korea), 1959; MPA, Seoul National University, 1964; PhD, University of Connecticut, 1967
- Young, Arthur Paul, *Campbell Chair and Professor of English and Engineering*. BA, University of Maryland, 1966; MA, 1968, PhD, 1971, Miami University
- Young, Franklin Alden, Jr., *Adjunct Professor of Bioengineering*. BS, 1960, MS, 1963, University of Florida; PhD, University of Virginia, 1967
- Young, Roland Curtin, *Visiting Lecturer in Management*. BS, Pennsylvania State University, 1942; LD, Temple University, 1950
- Young, Terence George, *Assistant Professor of Geography; Adjunct Assistant Professor of Parks, Recreation, and Tourism Management*. BA, 1973, MA, 1987, PhD, 1991, University of California-Los Angeles
- Yukish, Joseph Francis, *Professor of Curriculum and Instruction*. BS, 1965, MEd, 1972, California State College (Pennsylvania); PhD, University of Akron, 1978
- Zaczek, Barbara Maria, *Associate Professor of Italian*. BA, University of Cracow (Poland), 1972; MA, 1988, PhD, 1992, University of Oregon
- Zile, Michael R., *Adjunct Professor of Bioengineering*. BA, Knox College, 1974; MD, Rush University Medical School, 1977
- Zimmerman, James Kenneth, *Professor of Biochemistry*. BS, University of Nebraska, 1965; PhD, Northwestern University, 1969
- Zumbrunnen, David Arnold, *Professor of Mechanical Engineering*. BME, University of Minnesota, 1977; MSME, 1984, PhD, 1988, Purdue University; PE
- Zungoli, Patricia Ann, *Professor of Entomology*. BS, 1974, MS, 1979, University of Maryland; PhD, Virginia Polytechnic Institute and State University, 1982

*On leave.

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- Adams, Hewitt Dayne, PhD, *Professor Emeritus of History*
- Addison, Clarence Lee Benjamin, MArch, *Professor Emeritus of Construction Science and Management*
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- Alley, Forrest Christopher, PhD, *Professor Emeritus of Chemical Engineering*
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- Barth, Clyde Lewis, PhD, *Professor Emeritus of Agricultural and Biological Engineering*
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- Craven, Ruby Mae, PhD, *State Leader Emerita of Extension Home Economics Programs; Professor Emerita of Home Economics*
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- Cunningham, Bennie Lee, MS, *Professor Emeritus of Agricultural Education*

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- Deal, Elwyn Ernest, PhD, *Assistant Director Emeritus of Extension and Research*
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- Dillman, Buddy Leroy, PhD, *Professor Emeritus of Agricultural and Applied Economics*
- Dillon, Charles Ronald, PhD, *Professor Emeritus of Botany*
- Drew, Leland Overby, PhD, *Professor Emeritus of Engineering Technology*
- Duke, Albert Link, PhD, *Professor Emeritus of Electrical and Computer Engineering*
- Dunkle, Bernard Edward, MS, *Professor Emeritus of Engineering Graphics*
- Durham, Bill Gravely, MEd, *Professor Emeritus of Spanish*
- Edwards, James Leon, MS, *Assistant Dean Emeritus, College of Engineering; Professor Emeritus of Mechanical Engineering*
- Edwards, Robert Lee, PhD, *Professor Emeritus of Animal Science*
- Eland, Thomas Daniel, MS, *Associate Dean and Director Emeritus of Research of the College of Commerce and Industry; Professor Emeritus of Textiles*
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- Egan, Martin David, MS, *Professor Emeritus of Construction Science and Management*
- Elrod, Alvon Creighton, PhD, *Professor Emeritus of Mechanical Engineering*
- Epps, William Monroe, PhD, *State Pathologist Emeritus; Head and Professor Emeritus of Plant Pathology and Physiology*
- Eskew, Elias Benton, MS, *Professor Emeritus of Agronomy and Soils*
- Evans, John Stephen, BS, *Head Emeritus of Farms Department; Professor Emeritus of Agricultural and Biological Engineering*
- Ezell, Dan Odell, PhD, *Associate Director of Extension Emeritus*
- Fain, Charles Clifford, PhD, *Professor Emeritus of Ceramic Engineering*
- Fairey, John Edward III, PhD, *Professor Emeritus of Biological Sciences*
- Falk, Edward Lockwood, DPA, *Professor Emeritus of Planning Studies*
- Fanning, James Collier, PhD, *Professor Emeritus of Chemistry*
- Faris, Jesse Edwin, PhD, *Director Emeritus of International Programs of Agricultural and Natural Resources; Head and Professor Emeritus of Agricultural Economics and Rural Sociology*
- Felder, Herman McDonald, Jr., MA, *Professor Emeritus of English*
- Fernandez, Elena Gonzales, BA, *Professor Emerita of Spanish*
- Fernandez, Gaston Juan, PhD, *Professor Emeritus of Spanish*
- Fitch, Lewis Thomas, PhD, *Alumni Professor Emeritus of Electrical and Computer Engineering*
- Foley, Charles William, PhD, *Professor Emeritus of Animal and Veterinary Sciences*
- Foster, Carolyn Ezell, MA, *Professor Emerita of English*
- Fox, Richard Charles, PhD, *Professor Emeritus of Entomology*
- Fulmer, John Patrick, MS, *Professor Emeritus of Horticulture*
- Franklin, Joyce Byrd, MS, *County Extension Agent Emerita*
- Freeman, Edwin Armistead, PhD, *Professor Emeritus of Music*
- Gable, Paul Kistler, Jr., BA, *Assistant Director of Extension Emeritus*
- Gadson, Tyron, BS, *County Extension Agent Emeritus*
- Galloway, Elizabeth Boyce, EdD, *Alumni Distinguished Professor Emerita of Education*
- Garner, Thomas Harold, PhD, *Professor Emeritus of Agricultural and Biological Engineering*
- Garrison, Olen Branford, PhD, *Director Emeritus of Agricultural Experiment Station and Research in Agriculture; Professor Emeritus of Horticulture*
- Gaskins, Judith Collins, MS, *County Extension Agent Emerita*
- Geldard, John Francis, PhD, *Professor Emeritus of Chemistry*
- Gettys, William Edward, PhD, *Professor Emeritus of Physics*
- Gilchrist, Ralph Wayne, PhD, *Professor Emeritus of Electrical and Computer Engineering*
- Gilliland, Bobby Eugene, PhD, *Special Assistant Emeritus to the President; Professor Emeritus of Electrical and Computer Engineering*
- Gilreath, John Atkins, MS, *Professor Emeritus of Physics*
- Glick, Bruce, PhD, *Head and Professor Emeritus of Poultry Science*
- Glover, Judith Lyles, BA, *County Extension Agent Emerita*
- Godley, Willie Cecil, PhD, *Associate Dean Emeritus, College of Agricultural Sciences; Director Emeritus, Agricultural Experiment Station; Professor Emeritus of Animal Science*
- Goodin, Curtis Paul, MS, *Professor Emeritus of Robert M. Woodruff Cooper Library*
- Gordon, Donald Fleming, PhD, *Albany Professor Emeritus of Economics*
- Goree, James Gleason, PhD, *Centennial Professor Emeritus; Professor Emeritus of Mechanical Engineering and Engineering Mechanics*
- Goswami, Dixie Gooch, MA, *Professor Emerita of English*
- Gourlay, John Wallace Gordon, AMLS, *Director Emeritus of the Library*
- Graben, Henry Willingham, PhD, *Professor Emeritus of Physics*
- Gray, Charles Harmon, BA, *County Extension Agent Emeritus*
- Gray, Furman Ray, MS, *Associate Professor Emeritus of Accounting*
- Gray, Gordon Walter, EdD, *Dean Emeritus, College of Education*
- Griffin, Barbara Jean, MA, *Professor Emerita of Agricultural and Biological Engineering*
- Griffin, Duell Norton, MAT, *Professor Emeritus of English*
- Griffin, Villard Stuart, Jr., PhD, *Professor Emeritus of Geology*
- Haertling, Gene Henry, PhD, *Bishop Distinguished Professor Emeritus of Ceramic Engineering*
- Hamby, John Vernon, PhD, *Professor Emeritus of Education*
- Hamilton, Max Greene, PhD, *Professor Emeritus of Horticulture, Edisto Research and Education Center*
- Hammond, Alexander Francis, MS, *Professor Emeritus of Engineering Technology*
- Hammond, Joseph Langhorne, PhD, *Professor Emeritus of Electrical and Computer Engineering*
- Handlin, Dale Lee, MS, *Professor Emeritus of Animal Science*
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- Hardin, Thurman Craig, PhD, *Professor Emeritus of Mechanical Engineering*
- Harris, Maureen, MLS, *Professor Emerita of Libraries*
- Harshman, Richard Calvert, PhD, *Professor Emeritus of Chemical Engineering*
- Harvey, Lawrence Harmon, PhD, *Professor Emeritus of Agronomy and Soils*
- Harwell, Richard Lynn, PhD, *Professor Emeritus of Agricultural and Applied Economics*
- Haselton, George Montgomery, PhD, *Professor Emeritus of Geology*
- Hash, John Alex, EdD, *Professor Emeritus of Agricultural Education*
- Hauo, Joseph Rhodes, PhD, *Professor Emeritus of Horticulture*
- Haymond, Jacqueline Landis, PhD, *Professor Emerita of Forest Resources*
- Haymond, Robert Edward, PhD, *Professor Emeritus of Mathematical Sciences*
- Hays, Sidney Brooks, PhD, *Head and Professor Emeritus of Entomology*
- Hedden, Frank Howard, MS, *Professor Emeritus of Agricultural and Biological Engineering*
- Hegg, Richard Olaf, PhD, *Professor Emeritus of Agricultural and Biological Engineering*
- Helms, Carl Wilbert, PhD, *Professor Emeritus of Zoology*
- Hendrix, William Herlie, PhD, *Head and Professor Emeritus of Management*
- Hendrix, William Judson, MS, *County Extension Agent Emeritus*
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- Hind, Alfred Thomas, Jr., PhD, *Professor Emeritus of Mathematical Sciences*
- Hite, James Cleveland, PhD, *Alumni Professor Emeritus of Agricultural and Applied Economics*
- Hobson, James Harvey, PhD, *Alumni Professor Emeritus of Chemistry*
- Hochheimer, Laura, PhD, *Professor Emerita of Music*
- Holahan, Ursula Ann, MS, *Professor Emerita of Home Economics*
- Holt, Albert Hamilton, PhD, *Professor Emeritus of English*
- Hood, Clarence Elam, Jr., PhD, *Professor Emeritus of Agricultural and Biological Engineering*
- Hook, Donald Delose, PhD, *Professor Emeritus of Forestry*
- House, Verne Wadsden, PhD, *Professor Emeritus of Agricultural and Applied Economics*
- Howell, Nelda Kay, MEd, *Professor Emerita of Home Economics*
- Hubbard, John William, PhD, *Professor Emeritus of Agricultural Economics and Rural Sociology*
- Hubbard, Julius Clifford, Jr., MS, *Alumni Professor Emeritus of Textiles*
- Hudson, William Garraux, MS, *Professor Emeritus of Mechanical Engineering*
- Hughes, Buddy Lee, PhD, *Professor Emeritus of Animal and Veterinary Sciences*
- Hughes, Morris Burdette, PhD, *Professor Emeritus of Horticulture, Edisto Experiment Station*
- Hunter, Robert Howard, MFA, *Professor Emeritus of Visual Arts*
- Hurst, Victor, PhD, *Vice President Emeritus of Academic Affairs and Dean of the University; Dean Emeritus of the Graduate School; Alumni Professor Emeritus of Dairy Science*

- Idol, John Lane, Jr., PhD, *Alumni Professor Emeritus of English*
- Jameson, Lake Hugh, MS, *Professor Emeritus of Engineering Graphics*
- Jansen, Jacob John, PhD, *Professor Emeritus of Dairy Science*
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- Means, George Calvin, Jr., MArch, *Professor Emeritus of Architecture*
- Menke, Warren Wells, PhD, *Professor Emeritus of Management*
- Mercer, Robert Jack, EdD, *Professor Emeritus of Agricultural Education*
- Miller, Donald Piguet, PhD, *Professor Emeritus of Physics*
- Miller, Jacqueline, BS, *County Extension Agent Emerita*
- Miller, Max Gardner, PhD, *Professor Emeritus of Physics*
- Mixon, Robert Floyd, MA, *Professor Emeritus of Spanish*
- Morgan, Harvey Eugene, Jr., EdD, *Professor Emeritus of Industrial Education*
- Morr, Charles Vernon, PhD, *Stender Professor Emeritus of Food Science*
- Mullins, Joseph Chester, PhD, *Professor Emeritus of Chemical Engineering*
- Musen, Harold Louis, PhD, *Professor Emeritus of Agronomy and Soils*
- Newton, Alfred Franklin, EdD, *Head and Professor Emeritus of Industrial Education*
- Nicholson, James Harvey, MA, *Professor Emeritus of Mathematical Sciences*
- Nolan, Clifford Newell, PhD, *Professor Emeritus of Agronomy and Soils*
- Northern, William Laurus, PhD, *Professor Emeritus of Dairy Science*
- O'Dell, Glenn Dewitt, PhD, *Professor Emeritus of Dairy Science*
- Ogle, Wayne LeRoy, PhD, *Professor Emeritus of Horticulture*
- Olive, Edward Fleming, EdD, *Professor Emeritus of Education*
- Olson, Edward Sture, MS, *Professor Emeritus of Textile Chemistry*
- Owens, Walton Harrison, Jr., PhD, *Professor Emeritus of Political Science*
- Owings, Marvin Alpheus, PhD, *Head and Professor Emeritus of English*
- Oxendine, Laval, MS, *County Extension Agent Emeritus*
- Padgett, Adrian Lewis, MS, *Professor Emeritus of Agricultural Economics and Rural Sociology, Pee Dee Research and Education Center*

- Page, Norwood Rufus, PhD, Head Emeritus of Agricultural Chemical Services Department; Professor Emeritus of Agronomy and Soils
- Palmer, Merrill Craig, MA, Professor Emeritus of Mathematical Sciences
- Pardue, Fred Eugene, PhD, Professor Emeritus of Animal, Dairy, and Veterinary Sciences
- Parks, Clyde Leonard, PhD, Professor Emeritus of Agronomy and Soils
- Pate, Dove Henry, Jr., EdD, Professor Emeritus of Technology and Human Resource Development
- Peden, Ralph Kenneth, EdD, Professor Emeritus of Education
- Pennscoff, William Walter, EdD, Professor Emeritus of Education
- Perry, Leonard Thomas, PhD, Professor Emeritus of Spanish
- Perry, Robert Lindsay, MME, Professor Emeritus of Engineering Technology
- Pitner, John Bruce, PhD, Resident Director Emeritus, Pee Dee Research and Education Center; Professor Emeritus of Agronomy and Soils
- Platts, Rebecca Gaines, BA, County Extension Director Emerita
- Poe, Herbert Vernon, MS, Professor Emeritus of Electrical and Computer Engineering
- Polk, George Merritt, Jr., MArch, Professor Emeritus of Architecture
- Polk, Henry Tasker, PhD, Professor Emeritus of Chemistry
- Porter, John Jefferson, PhD, Professor Emeritus of Textiles, Fiber, and Polymer Science
- Prevost, Aileen Sain, MN, Professor Emerita of Nursing
- Privette, Charles Victor, Jr., MS, Professor Emeritus of Agricultural and Biological Engineering
- Rausch, Karl William, ME, Professor Emeritus of Mechanical Engineering
- Reamer, Larry Donald, MS, Professor Emeritus of Forestry
- Reeves, Calvin Bright, MS, Professor Emeritus of Dairy Science
- Regnier, Ireland Goldsmith, MFA, Professor Emeritus of Visual Arts
- Rhodes, William Hancel, BS, Superintendent Emeritus of Sandhill Experiment Station; Professor Emeritus of Horticulture
- Rich, Linvil Gene, PhD, Professor Emeritus of Environmental Systems Engineering
- Richardson, Eleanor Joyce, MS, Professor Emerita of Family and Youth Development
- Richardson, Joel Landrum, MS, Professor Emeritus of Industrial Management
- Richardson, John Coakley, EdD, Professor Emeritus of Special Education
- Ridley, John Davis, MS, Professor Emeritus of Horticulture
- Rife, Lawrence Albert, MA, Professor Emeritus of Mathematical Sciences
- Risher, Charles Franklin, BS, Professor Emeritus of Poultry Science
- Ritchie, Robert Russell, MS, Professor Emeritus of Animal Science
- Roberson, Georgia Taylor, MEd, State 4-H and Youth Development Coordinator Emerita; Professor Emerita of Home Economics
- Roberts, William Russell, MS, Professor Emeritus of 4-H and Youth Development
- Rogers, Ernest Brasington, Jr., MS, Professor Emeritus of Agricultural Education
- Rogers, Hilton Vernard, MS, Head Emeritus of Fertilizer Inspection Department; Professor Emeritus of Agronomy and Soils
- Rogers, William Bryan, BS, Superintendent Emeritus of Edisto Experiment Station
- Rollin, Roger Best, PhD, Lemon Professor Emeritus of Literature
- Rostron, Joseph Prugh, MCE, Professor Emeritus of Civil Engineering
- Roswal, Leon, MS, Director and Professor Emeritus of Association in Arts Nursing
- Roth, Frederick George, MArch, Professor Emeritus of Architecture
- Ruckle, William Henry, PhD, Professor Emeritus of Mathematical Sciences
- Rudisill, Carl Sidney, PhD, Professor Emeritus of Mechanical Engineering
- Rudowski, Victor Anthony, PhD, Professor Emeritus of English
- Ruff, William James, BS, County Extension Agent Emeritus
- Russo, Kenneth John, MA, Professor Emeritus of Architecture
- Ryan, Daniel Leo, PhD, Professor Emeritus of Engineering Graphics
- Salley, James Raworth, Jr., MS, Professor Emeritus of Chemistry
- Savitsky, George Boris, PhD, Professor Emeritus of Chemistry
- Sawyer, Corinne Holt, PhD, Professor Emerita of English
- Schwartz, Arnold Edward, PhD, Dean Emeritus of Graduate School; Professor Emeritus of Civil Engineering
- Schwartz, Carol Young, MSN, Professor Emerita of Health Science
- Sefick, Harold John, MS, Professor Emeritus of Horticulture
- Sellers, Harold Calvin, BSIE, Professor Emeritus of Computer Science
- Senn, Louie Hampton, Jr., PhD, Director Emeritus of Regulatory and Public Service Programs
- Senn, Taze Leonard, PhD, Head and Professor Emeritus of Horticulture
- Seo, Kenzo, PhD, Professor Emeritus of Mathematical Sciences
- Shain, William Arthur, PhD, Professor Emeritus of Forest Resources
- Sherrill, Max Douglas, PhD, Professor Emeritus of Physics
- Shimel, William Alexander, PhD, State Extension Leader Emeritus
- Sias, Frederick Ralph, Jr., PhD, Professor Emeritus of Electrical and Computer Engineering
- Siedschlag, Everett William, BS, Professor Emeritus of Agricultural Economics
- Simms, John Barber, MA, Professor Emeritus of English
- Simon, Frederick Tyler, MS, Professor Emeritus of Textile Science
- Sitterly, Wayne Robert, PhD, Resident Director Emeritus of Coastal Research and Education Center; Professor Emeritus of Plant Pathology
- Skardon, Beverly Norton, MA, Professor Emeritus of English
- Skelton, Billy Ray, PhD, Professor Emeritus of Economics
- Skelton, Bobby Joe, PhD, Vice Provost and Dean Emeritus of Admissions and Registration; Professor Emeritus of Horticulture
- Skelton, Thomas Eugene, PhD, Head and Professor Emeritus of Entomology
- Skove, Malcolm John, PhD, Alumni Professor Emeritus of Physics
- Smith, Chester Roland, PhD, Professor Emeritus of Industrial Management
- Snell, Absalom West, PhD, Associate Director Emeritus of Agricultural Experiment Station; Professor Emeritus of Agricultural Engineering
- Snelsire, Robert William, PhD, Professor Emeritus of Electrical and Computer Engineering
- Snipes, David Strange, PhD, Professor Emeritus of Geology
- Sowell, Talley West, MS, County Extension Agent Emerita
- Spadoni, Rosemary Ann, MSN, Professor Emerita of Nursing
- Sparks, LeGrand McIver, MS, Professor Emeritus of Entomology
- Spurlock, Hooper Clyde, PhD, Professor Emeritus of Agricultural Economics and Rural Sociology
- Spragins, John Diggs, PhD, Professor Emeritus of Electrical and Computer Engineering
- Spray, Richard Allman, PhD, Professor Emeritus of Agricultural and Biological Engineering
- Stanley, Edward Lemuel, MS, Professor Emeritus of Mathematical Sciences
- Stanton, Lynn Arthur, PhD, Professor Emeritus of Agricultural and Applied Economics
- Steadman, Mark Sidney, Jr., PhD, Alumni Distinguished Professor Emeritus of English and Winter in Residence
- Steiner, Pinckney Alston, PhD, Professor Emeritus of Physics
- Stephens, Robert Lorin, MS, County Extension Agent Emeritus
- Stevenson, John Lovett, PhD, Assistant Dean Emeritus of Undergraduate Studies; Director Emeritus of Honors Program; Professor Emeritus of Parks, Recreation, and Tourism Management
- Stewart, Harry Eugene, PhD, Professor Emeritus of French
- Stillwell, Ephraim Posey, Jr., PhD, Professor Emeritus of Physics
- Stuart, Charles Morgan, MA, Professor Emeritus of Mathematics
- Sturgis, Eugenie Ventre, MS, Professor Emerita of Mathematical Sciences
- Sullivan, Sophia Elizabeth, MS, Librarian Emerita of Cataloging
- Suman, Reynold Foy, MS, Professor Emeritus of Agronomy and Soils
- Sutcliffe, Priscilla Heath, MSLS, Librarian Emerita of Special Collections
- Sutherland, Milford Hunt, MS, Professor Emeritus of Agricultural Economics and Rural Sociology
- Swanson, David Mitchell, PhD, Professor Emeritus of Management and Economics
- Swicegood, Myrle Lutterloh, PhD, Assistant Director Emerita of Extension Home Economics; Professor Emerita of Home Economics
- Syme, John Hutton, PhD, Professor Emeritus of Forest Resources
- Tanner, Gloria Ann, EdD, Professor Emerita of Nursing Science
- Taras, Michael Andrew, PhD, Head and Professor Emeritus of Forest Resources
- Thode, Frederick Wilburn, MS, Professor Emeritus of Horticulture
- Thompson, Regina, MA, Professor Emerita of Nursing
- Thurston, James Norton, SCD, Head and Professor Emeritus of Electrical and Computer Engineering
- Tinsley, William Allan, PhD, Professor Emeritus of Agricultural and Applied Economics
- Titus, Terry Charles, PhD, Professor Emeritus of Food Science
- Todd, Boyd Joseph, PhD, Head and Professor Emeritus of Industrial Management
- Trent, Buford Earl, MEd, Professor Emeritus of Parks, Recreation, and Tourism Management
- Trevillian, Wallace Dabney, PhD, Dean Emeritus, College of Commerce and Industry; Professor Emeritus of Economics

- Trively, Ilo Allely, MS, *Professor Emeritus of Civil Engineering*
- Turk, Donald Earle, PhD, *Professor Emeritus of Food Science*
- Turner, James Alexander, Jr., JD, *Professor Emeritus of Accounting*
- Ulbrich, Carlton Wilbur, PhD, *Professor Emeritus of Physics*
- Ulbrich, Holley Hewitt, PhD, *Alumni Professor Emerita of Economics*
- Underwood, Richard Allan, PhD, *Professor Emeritus of English*
- Usrey, Malcolm Orthell, PhD, *Professor Emeritus of English*
- Varenhorst, Glenn Elmer, MS, *Professor Emeritus of Planning Studies*
- Vissage, Wayne King, MS, *County Extension Agent Emeritus*
- Vogel, Henry Elliott, PhD, *Dean Emeritus, College of Sciences, Professor Emeritus of Physics*
- Von Rosenberg, Joseph Leslie, Jr., PhD, *Professor Emeritus of Chemistry*
- Von Tungen, George Robert, PhD, *Professor Emeritus of Agricultural Economics and Rural Sociology*
- Waddle, Gerald Lee, PhD, *Professor Emeritus of Marketing*
- Wagner, Donald Finch, PhD, *Professor Emeritus of Horticulture*
- Walker, John Henry, PhD, *Professor Emeritus of Educational Foundations*
- Walker, Walter Saxon, MEd, *Professor Emeritus of Poultry Science*
- Wallenius, Kenneth Ted, PhD, *Professor Emeritus of Mathematical Sciences*
- Waller, Robert Alfred, PhD, *Dean Emeritus, College of Liberal Arts; Professor Emeritus of History*
- Wannamaker, John Murray, PhD, *Professor Emeritus of Accounting*
- Wannamaker, Patricia Walker, PhD, *Professor Emerita of German*
- Ware, Robert Edward, BS, *Professor Emeritus of Zoology*
- Warner, John Robinson, DE, *Professor Emeritus of Forestry*
- Watkins, Betty Palmer, PhD, *Professor Emerita of Vocational Education*
- Watson, Katherine Ramsey, MMath, *Professor Emerita of Mathematical Sciences*
- Webb, Byron Kenneth, PhD, *Dean and Director Emeritus of Cooperative Extension Service; Professor Emeritus of Agricultural and Biological Engineering*
- Webb, Hugh Weyman, MS, *Professor Emeritus of Building Science*
- Webster, Henry Wise, PhD, *Professor Emeritus of Animal, Dairy, and Veterinary Science*
- Wells, Amos, Jr., BS, *County Extension Agent Emeritus*
- Welter, John Finlay, MS, *Professor Emeritus of Poultry Science*
- Wheeler, Alan Dexter, MBA, *Assistant Head and Professor Emeritus of Management*
- Wheeler, Richard Ferman, PhD, *Head and Professor Emeritus of Animal Science*
- White, Donald, BS, *County Extension Agent Emeritus*
- White, Richard Kenneth, PhD, *Newman Professor Emeritus of Natural Resources Engineering in Agricultural and Biological Engineering and Environmental Engineering and Science*
- Whitehurst, Clinton Howard, Jr., PhD, *Professor Emeritus of Management and Economics*
- Whitmire, Jerry Morris, MA, *Professor Emeritus of Spanish*
- Whitney, John Barry, Jr., PhD, *Professor Emeritus of Botany*
- Whitten, William Clyde, Jr., PhD, *Professor Emeritus of Economics*
- Wiggins, Emily Sutherland, EdD, *Professor Emerita of Home Economics*
- Willey, Edward Parker, PhD, *Professor Emeritus of English*
- Williams, John Boyce, BS, *State 4-H and Youth Development Coordinator Emeritus; Professor Emeritus of Agricultural Education*
- Williams, John Newton II, PhD, *Professor Emeritus of Animal Science*
- Williams, Woodie Prentiss, Jr., PhD, *Professor Emeritus of Food Science*
- Williford, Cynthia Williams, MS, *Assistant to State Leader Emerita of Extension Home Economics; Professor Emerita of Home Economics*
- Willis, Samuel Marsh, PhD, *Professor Emeritus of Industrial Management*
- Wilson, Milner Bradley, Jr., MA, *Professor Emeritus of English*
- Wilson, Thomas Virgil, PhD, *Alumni Professor Emeritus of Agricultural and Biological Engineering*
- Wise, John Frederick, MS, *Professor Emeritus of Animal Science*
- Wise, Milton Bee, PhD, *Vice President/Vice Provost of Agriculture and Natural Resources Emeritus; Professor Emeritus of Animal, Dairy, and Veterinary Sciences*
- Witcher, Wesley, PhD, *Professor Emeritus of Plant Pathology and Physiology*
- Witherspoon, Gayland Brooks, MSArch, *Associate Dean Emeritus of the College of Architecture; Professor Emeritus of Architecture*
- Withington, Marian Hull, MS, *Librarian Emerita*
- Wixson, Bobby Guinn, PhD, *Dean Emeritus, College of Sciences; Professor Emeritus of Biological Sciences*
- Wolf, James Steven, PhD, *Professor Emeritus of Mechanical Engineering and Metallurgy*
- Wood, Julia Taylor, MS, *Professor Emerita of Home Economics*
- Wood, Kenneth Lee, MS, *Professor Emeritus of Physics*
- Woodruff, James Raymond, PhD, *Professor Emeritus of Agronomy and Soils*
- Woods, Sam Gray, BS, *Professor Emeritus of Animal Science, Edisto Experiment Station*
- Wright, Robert Eugene, DVM, *Professor Emeritus of Animal Science*
- Yang, Tah-Teh, PhD, *Professor Emeritus of Mechanical Engineering*
- Yardley, Darrell Gene, PhD, *Professor Emeritus of Zoology*
- Yates, William Pierce, MS, *Extension Program Coordinator Emeritus*
- Young, Joseph Laurie, MArch, *Professor Emeritus of Architecture*
- Zahner, Robert, PhD, *Professor Emeritus of Forestry*
- Zehr, Eldon Irvin, PhD, *Professor Emeritus of Plant Pathology and Physiology*
- Zielinski, Paul Bernard, PhD, *Director Emeritus, Water Resource Research Institute; Professor Emeritus of Civil Engineering*
- Zink, William Talbott, Jr., MSEE, *Professor Emeritus of Electrical and Computer Engineering*

COURSE ABBREVIATIONS

A A H	Art and Architectural History	G S	Graduate Studies
A A S	African American Studies	G W	Great Works
A S	Aerospace Studies	GEN	Genetics
A S L	American Sign Language	GEOG	Geography
ACCT	Accounting	GEOL	Geology
AG ED	Agricultural Education	GER	German
AG M	Agricultural Mechanization	H ADM	Hospital and Health Services Administration
AGRIC	Agriculture	H R D	Human Resource Development
AN PH	Animal Physiology	HIST	History
ANTH	Anthropology	HLTH	Health
AP EC	Agricultural and Applied Economics	HORT	Horticulture
ARCH	Architecture	HUM	Humanities
ART	Art	I E	Industrial Engineering
ASTR	Astronomy	I P M	Integrated Pest Management
AVS	Animal and Veterinary Sciences	IN ED	Industrial Education
B E	Biosystems Engineering	ITAL	Italian
BIO E	Bioengineering	JAPN	Japanese
BIOCH	Biochemistry	L S	Leisure Skills
BIOL	Biology	L&IT	Language and International Trade
BIOSC	Biological Sciences	LANG	Language
BOT	Botany	LARCH	Landscape Architecture
BUS	Business	LATIN	Latin
C E	Civil Engineering	LAW	Legal Studies
C ED	Coaching Education	M B A	Business Administration
C H S	Calhoun Honors Seminar	M E	Mechanical Engineering
C M E	Ceramic and Materials Engineering	M H A	Master of Health Administration
C R D	Community and Rural Development	M S	Military Science
C R P	Planning Studies	M T	Medical Technology
C S M	Construction Science and Management	MA SC	Management Science
CH	Chemistry	MAT E	Materials Engineering
CHIN	Chinese	MGT	Management
CH E	Chemical Engineering	MICRO	Microbiology
CP SC	Computer Science	MKT	Marketing
CSENV	Crop and Soil Environmental Science	MTHSC	Mathematical Sciences
DANCE	Dance	MUSIC	Music
DSIGN	Design Studies	NURS	Nursing
E C E	Electrical and Computer Engineering	NUTR	Nutrition
E G	Engineering Graphics	PH SC	Physical Science
E L E	Executive Leadership and Entrepreneurship	PHIL	Philosophy
E M	Engineering Mechanics	PHYS	Physics
ECON	Economics	PKGSC	Packaging Science
ED	Education: Curriculum and Instruction	PL PA	Plant Pathology
ED C	Educational Counseling	PL PH	Plant Physiology
ED F	Educational Foundations	PO SC	Political Science
ED L	Educational Leadership	PORT	Portuguese
ED SP	Special Education	PRTM	Parks, Recreation, and Tourism Management
EE&S	Environmental Engineering and Science	PSYCH	Psychology
EN SP	Environmental Science and Policy	R S	Rural Sociology
ENGL	English	REL	Religion
ENGR	Engineering	RUSS	Russian
ENT	Entomology	SOC	Sociology
ENTOX	Environmental Toxicology	SPAN	Spanish
EX ST	Experimental Statistics	SPCH	Speech
F&RR	Forest and Recreation Resources	T C	Textile Chemistry
FD SC	Food Science	TEXT	Textile Management and Textile Science
FD TH	Food Technology	THEA	Theatre
FIN	Finance	THRD	Technology and Human Resource Development
FOR	Forest Resources	VT ED	Vocational-Technical Education
FR	French	W F B	Wildlife and Fisheries Biology
G C	Graphic Communications	W S	Women's Studies

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